

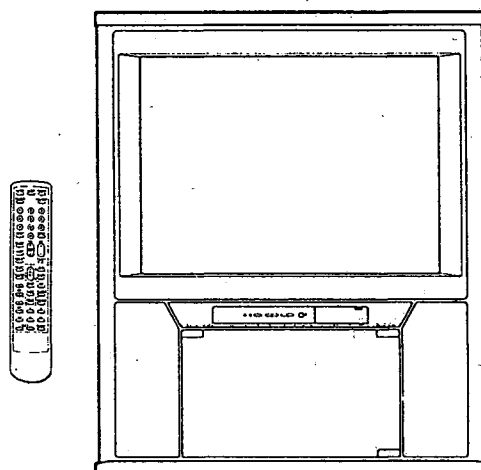
KV-27TW77/27TW78 KV-32TW77/32TW78

RM-Y118

SERVICE MANUAL

US Model

KV-27TW77 Chassis No. SCC-F84F-A
KV-27TW78 Chassis No. SCC-F84G-A
KV-32TW77 Chassis No. SCC-F84J-A
KV-32TW78 Chassis No. SCC-F84K-A



AA-1 CHASSIS

MODELS OF THE SAME SERIES

KV-27TW77/27TW78	KV-27TS29/27TS32/27TS36
KV-32TW77/32TW78	KV-32TS36/32TS46
KV-2970RS/2970M/2975M	

SPECIFICATIONS

Television system	American TV standards	Input	VIDEO and S VIDEO S VIDEO IN (S terminal) Y: 1 Vp-p, 75-ohms unbalanced, sync negative C: 0.286 Vp-p (Burst signal), 75-ohms
Channel coverage	VHF: 2-13 UHF: 14-69 Cable TV: 1-125		Video (phono jacks): 1 Vp-p, 75-ohms unbalanced, sync negative
Picture tube	Hi-Black Trinitron® tube 27-inch picture measured diagonally 29-inch picture tube measured diagonally (KV-27TW77/27TW78) 32-inch picture measured diagonally 34-inch picture tube measured diagonally (KV-32TW77/32TW78)	Output	Audio (phono jacks): 500 mVrms (100% modulation) Impedance: 47 kilohms
Antenna	75-ohm external antenna terminal for VHF/UHF		AUDIO OUT (phono jacks) More than 408 mVrms at the maximum volume setting (variable) More than 408 mVrms (fix) Impedances: 5 kilohms

— Continued on next page —



TRINITRON® COLOR TV SONY®

Speaker output 5 W × 2

Audio frequency response: Front 80 Hz – 20 kHz

Power requirements 120 V AC, 60 Hz

Power consumption

KV-27TW77	170 W
KV-27TW78	170 W
KV-32TW77	195 W
KV-32TW78	195 W

standby mode 5 W

Dimensions/Weight

	Dimensions (w/h/d)	Weight
KV-27TW77	750 × 1041 × 655 mm (29 ⁵ / ₈ × 41 × 25 ⁷ / ₈ in.)	83.6 kg (184 lbs)
KV-27TW78	750 × 1041 × 655 mm (29 ⁵ / ₈ × 41 × 25 ⁷ / ₈ in.)	83.6 kg (184 lbs)
KV-32TW77	895 × 1117 × 700 mm (35 ¹ / ₄ × 44 × 27 ⁵ / ₈ in.)	108.6 kg (239 lbs)
KV-32TW78	895 × 1117 × 700 mm (35 ¹ / ₄ × 44 × 27 ⁵ / ₈ in.)	108.6 kg (239 lbs)

Supplied accessories

Remote Commander RM-Y118(1) with 1 size AA (R6) EVEREADY battery

Recommended accessories

U/V mixer EAC-66
 Connecting cable
 VMC-810S/820S, VMC-720M,
 YC-15V/30V, RK-74A

Design and specifications are subject to change without notice.

(CAUTION)


SHORT CIRCUIT THE ANODE OF THE PICTURE TUBE AND THE ANODE CAP TO THE METAL CHASSIS, CRT SHIELD, OR CARBON PAINTED ON THE CRT, AFTER REMOVING THE ANODE.

WARNING!!

AN ISOLATION TRANSFORMER SHOULD BE USED DURING ANY SERVICE TO AVOID POSSIBLE SHOCK HAZARD, BECAUSE OF LIVE CHASSIS.

THE CHASSIS OF THIS RECEIVER IS DIRECTLY CONNECTED TO THE AC POWER LINE.

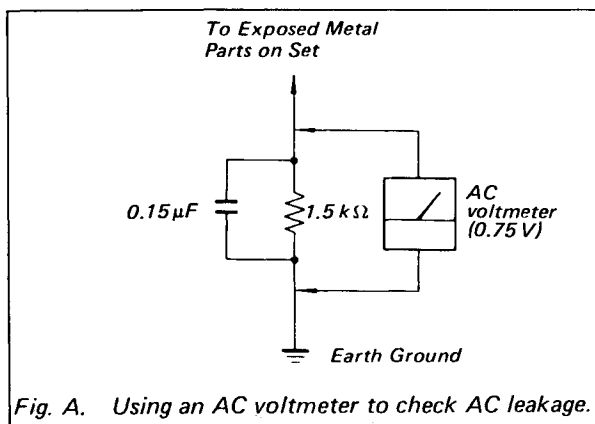
SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND MARK  ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY. CIRCUIT ADJUSTMENTS THAT ARE CRITICAL TO SAFE OPERATION ARE IDENTIFIED IN THIS MANUAL. FOLLOW THESE PROCEDURES WHENEVER CRITICAL COMPONENTS ARE REPLACED OR IMPROPER OPERATION IS SUSPECTED.

SAFETY CHECK-OUT (US Model Only)

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Check that all control knobs, shields, covers, ground straps, and mounting hardware have been replaced. Be absolutely certain that you have replaced all the insulators.
4. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
5. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
6. Check the line cord for cracks and abrasion. Recommend the replacement of any such line cord to the customer.
7. Check the condition of the monopole antenna (if any).
Make sure the end is not broken off, and has the plastic cap on it. Point out the danger of impalement on a broken antenna to the customer, and recommend the antenna's replacement.
8. Check the B+ and HV to see they are at the values specified. Make sure your instruments are accurate; be suspicious of your HV meter if sets always have low HV.
9. Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.



LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA (500 microamperes). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2V AC range are suitable. (See Fig. A)

HOW TO FIND A GOOD EARTH GROUND

A cold-water pipe is guaranteed earth ground; the cover-plate retaining screw on most AC outlet boxes is also at earth ground. If the retaining screw is to be used as your earth-ground, verify that it is at ground by measuring the resistance between it and a cold-water pipe with an ohmmeter. The reading should be zero ohms. If a cold-water pipe is not accessible, connect a 60–100 watts trouble light (not a neon lamp) between the hot side of the receptacle and the retaining screw. Try both slots, if necessary, to locate the hot side of the line, the lamp should light at normal brilliance if the screw is at ground potential. (See Fig. B)

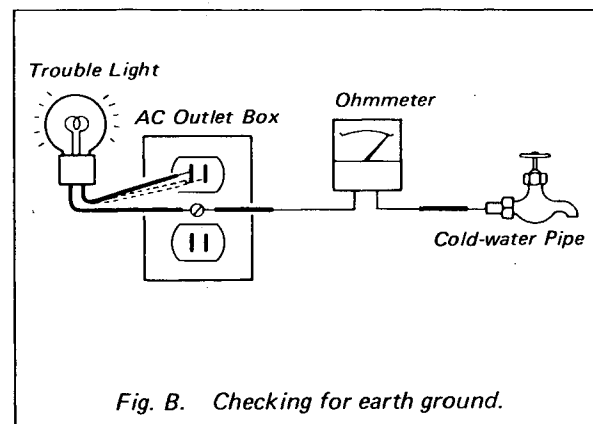


TABLE OF CONTENTS

<u>Section</u>	<u>Title</u>	<u>Page</u>	<u>Section</u>	<u>Title</u>	<u>Page</u>
1. GENERAL			4. SAFETY RELATED ADJUSTMENTS		39
1-1.	Locating the Controls	5	5. CIRCUIT ADJUSTMENTS		
1-2.	Using the On-Screen Menus	7	5-1.	Electrical Adjustment by Remote Commander	41
1-3.	Turning the Cable Mode On or Off	8	5-2.	M Board Adjustments	43
1-4.	Presetting TV Channels	9	5-3.	P Board Adjustments	46
1-5.	Connecting Other Equipment	11	6. DIAGRAMS		
1-6.	Watching TV Programs	13	6-1.	Block Diagrams	47
1-7.	Using Convenient Features	14	6-2.	Frame Schematic Diagram	57
1-8.	Using Closed Caption	14	6-3.	Circuit Boards Location	60
1-9.	Watching Two Pictures at Once (Picture-in-Picture)	15	6-4.	Schematic Diagrams and Printed Wiring Boards	
1-10.	Using the Timer-Activated Functions	18	(1)	Schematic Diagram of D Board	61
1-11.	Customizing the Screen Display	21	(2)	Schematic Diagram of A, E and H Boards	69
1-12.	Using the Pre-Programmed Remote Commander	23	(3)	Schematic Diagram of UA Board	73
2. DISASSEMBLY			(4)	Schematic Diagram of P Board	83
2-1.	Rear Plate Removal	24	(5)	Schematic Diagram of M Board	87
2-2.	Chassis Assy Removal	24	(6)	Schematic Diagram of C Board	94
2-3.	Service Position	24	6-5.	Semiconductors	96
2-4.	P Board and P Bracket Removal	24	7. EXPLODED VIEWS		
2-5.	UA Board Removal	25	7-1.	Chassis	97
2-6.	Extension Cable	25	7-2.	Cover	98
2-7.	Picture Tube Removal (1) (KV-27TW77/27TW78 only)	26	7-3.	Picture Tube	99
	Picture Tube Removal (2) (KV-32TW77/32TW78 only)	27	8. ELECTRICAL PARTS LIST		100
2-8.	Repair of Chip Component Circuit Board	28			
3. SET-UP ADJUSTMENTS					
3-1.	Beam Landing	33			
3-2.	Convergence	34			
3-3.	Focus Adjustment	37			
3-4.	G2 (Screen) and White Balance Adjustments	38			

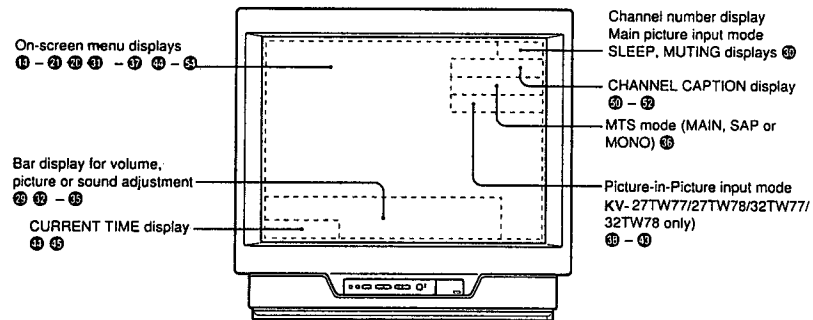
SECTION 1 GENERAL

The operating instructions mentioned here are partial abstracts from the Operating Instruction Manual. The page numbers of the Operating Instruction Manual remain as in the manual.

1-1. LOCATING THE CONTROLS

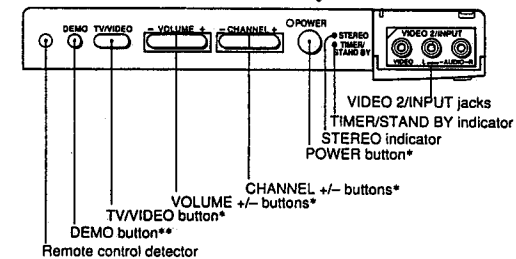
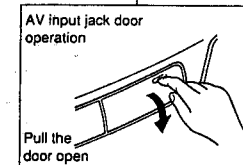
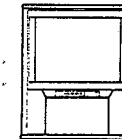
Screen Displays

For details, see the pages indicated by the numbered black circles ●.



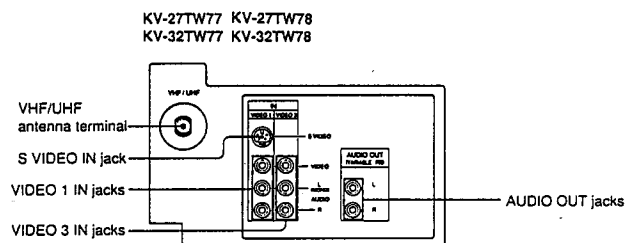
Front Panel

KV-27TW77 KV-32TW77
KV-27TW78 KV-32TW78



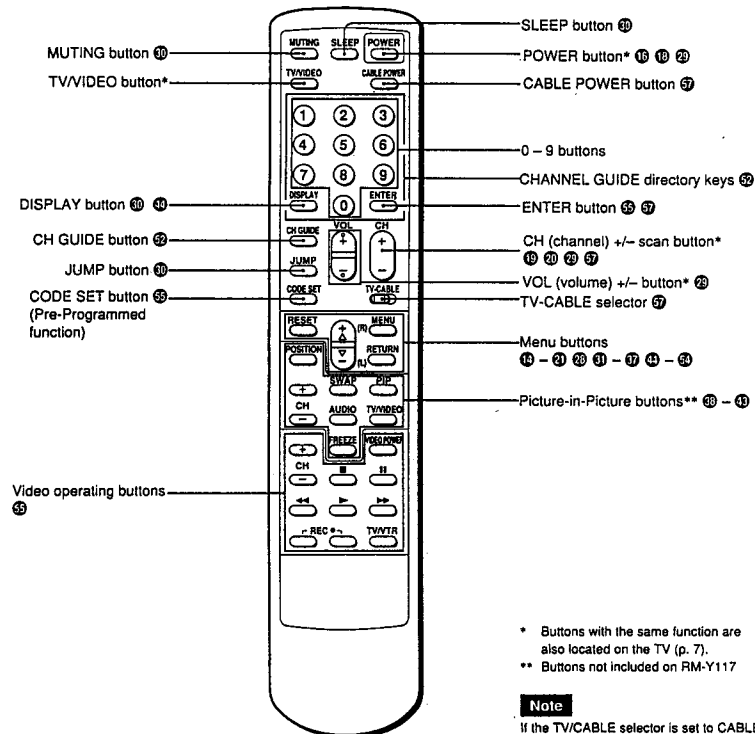
- * Buttons with the same function are also located on the Remote Commander (pp. 10 - 11).
- ** If you press this button, functions and menus are displayed one by one. Press any button to stop DEMO.

Rear Panel



Remote Commander

For details, see the pages indicated by the numbered black circles ●.



RM-Y118: KV-27TS36 KV-32TS36
KV-32TS46 KV-27TW77
KV-27TW78 KV-32TW77
KV-32TW78
(RM-Y117: KV-27TS32)

* Buttons with the same function are also located on the TV (p. 7).
** Buttons not included on RM-Y117

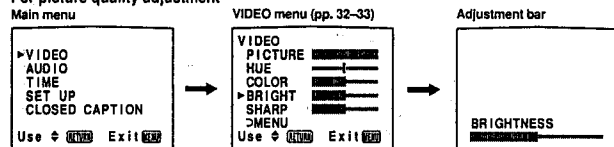
Note

If the TV/CABLE selector is set to CABLE, the Remote Commander is able to control a connected cable box, not the TV. Set the selector to TV to control the TV set with the Remote Commander (You can use POWER button at any case).

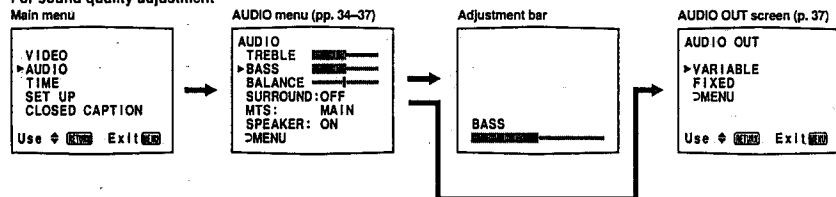
1-2. USING THE ON-SCREEN MENUS

The following flow chart shows the different levels of on-screen menus that you can use to make various adjustments and settings. See the indicated pages for instructions on using each feature.

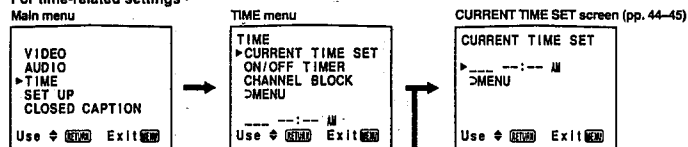
For picture quality adjustment



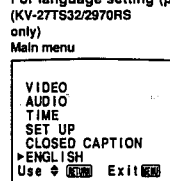
For sound quality adjustment



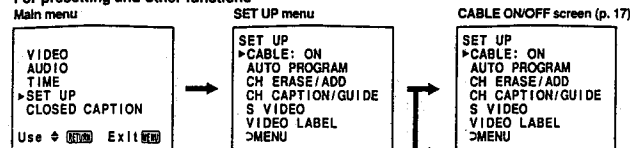
For time-related settings



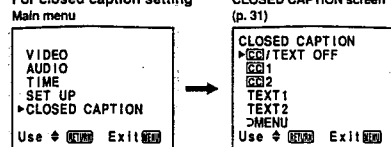
For language setting (p. 16)



For presetting and other functions

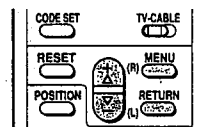


For closed caption setting



Navigating through the Menus

Remote Commander



To display the main menu

Press MENU.

To return to the previous menu

Press Δ or ∇ to select "MENU."

Then press RETURN.

To return to the main menu

Repeat the above, until you reach the main menu.

To return to the normal screen

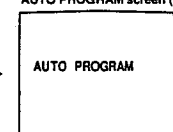
Press MENU on the Remote Commander.

Note

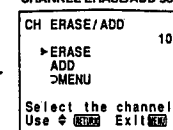
The menus disappear automatically if you do not press a button within 90 seconds.

The menu you cannot select appears in black.

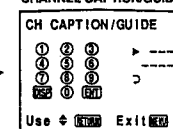
AUTO PROGRAM screen (p. 18)



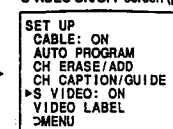
CHANNEL ERASE/ADD screen (pp. 19-21)



CHANNEL CAPTION/GUIDE screen (pp. 50-51)

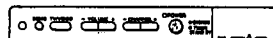


S VIDEO ON/OFF screen (p. 28)



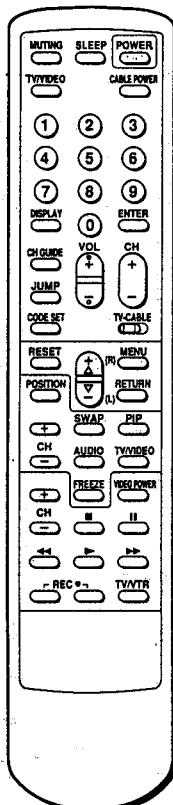
VIDEO LABEL screen (pp. 53-54)





Changing the Menu Language (KV-27TS32/2970RS only)

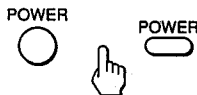
The menu language is factory-set to ENGLISH. Follow these instructions to change the menu language to Spanish or back to English.



RM-Y118

To return to the normal screen
Press MENU.

- 1 Press POWER on the TV or the Remote Commander to turn the TV on.



- 2 Press MENU.



VIDEO
AUDIO
TIME
SET UP
CLOSED CAPTION
ENGLISH
Use Δ RETURN Exit

- 3 Press Δ or ∇ to select ENGLISH. Then press RETURN.



VIDEO
AUDIO
TIME
SET UP
CLOSED CAPTION
ENGLISH
Use Δ RETURN Exit

- 4 Press Δ or ∇ to select language. Each time you press Δ or ∇ , ESPAÑOL and ENGLISH menus appear.



VIDEO
AUDIO
HORA
AJUSTES
CLOSED CAPTION
ESPAÑOL
Use Δ RETURN Salir

VIDEO
AUDIO
TIME
SET UP
CLOSED CAPTION
ENGLISH
Use Δ RETURN Exit

Note

Certain parts of the ESPAÑOL menus remain in English.

- 5 Press RETURN.



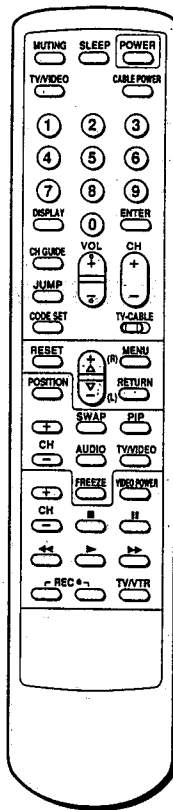
VIDEO
AUDIO
HORA
AJUSTES
CLOSED CAPTION
ESPAÑOL
Use Δ RETURN Salir

Spanish menu

1-3. TURNING THE CABLE MODE ON OR OFF

All of the controls are on the Remote Commander.

If you have cable connected to your TV (pp.12-13), follow the steps below to turn the cable connection on or off. CABLE is preset to ON when you use your TV for the first time. Then turn CABLE to OFF to preset or watch VHF or UHF channels (pp.18-21 and 29).



RM-Y118

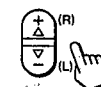
To return to the normal screen
Press MENU.

- 1 Press MENU.



VIDEO
AUDIO
TIME
SET UP
CLOSED CAPTION
Use Δ RETURN Exit

- 2 Press Δ or ∇ to select SET UP.



VIDEO
AUDIO
TIME
SET UP
CLOSED CAPTION
Use Δ RETURN Exit

Press RETURN.
The SET UP menu appears, and the cursor points to "CABLE".



SET UP
CABLE: ON
AUTO PROGRAM
CH ERASE/ADD
CH CAPTION/GUIDE
S VIDEO
VIDEO LABEL
>MENU

Note

If the CABLE display appears in black, the TV is in VIDEO mode and you cannot select CABLE. Press TV/VIDEO to change to TV mode.

- 3 Press RETURN again.



SET UP
CABLE: ON
AUTO PROGRAM
CH ERASE/ADD
CH CAPTION/GUIDE
S VIDEO
VIDEO LABEL
>MENU

Press Δ or ∇ to select ON or OFF alternately.

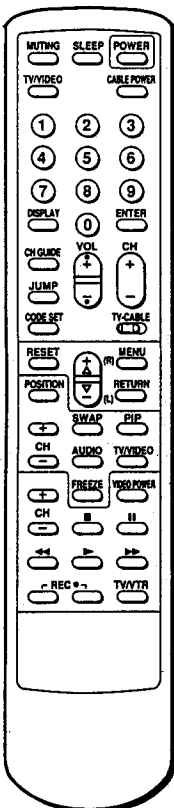
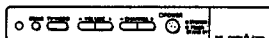
SET UP
CABLE: ON
AUTO PROGRAM
CH ERASE/ADD
CH CAPTION/GUIDE
S VIDEO
VIDEO LABEL
>MENU



SET UP
CABLE: OFF
AUTO PROGRAM
CH ERASE/ADD
CH CAPTION/GUIDE
S VIDEO
VIDEO LABEL
>MENU

Press RETURN.
The setting is completed.

1-4. PRESETTING TV CHANNELS



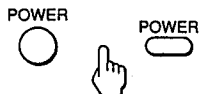
RM-Y118

Channels that can be received on this TV:

VHF	UHF	Cable
2-13	14-69	1-125

Presetting TV Channels Automatically

- 1 Press POWER on the TV or the Remote Commander to turn the TV on.



- 2 Set the cable connection on or off, depending on if you want to preset cable or VHF/UHF channels.
(Follow the steps in "Turning the Cable Mode On or Off", p.17)

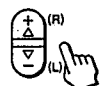
If "VIDEO" is displayed on the screen, press the TV/VIDEO button on the TV or the Remote Commander so that a channel number appears.

- 3 Press MENU.
The main menu appears.



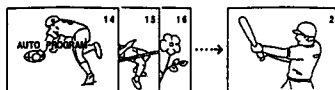
VIDEO
AUDIO
TIME
SET UP
CLOSED CAPTION
Use Δ (R) Exit (L)

- 4 Press Δ or ∇ to select SET UP.
Then press RETURN.
The SET UP menu appears.



SET UP
CABLE: ON
AUTO PROGRAM
CH ERASE/ADD
CH CAPTION/GUIDE
S VIDEO
VIDEO LABEL
>MENU

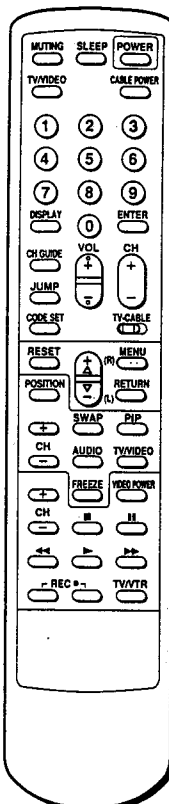
- 5 Press Δ or ∇ to select AUTO PROGRAM.
Then press RETURN.



SET UP
CABLE: ON
AUTO PROGRAM
CH ERASE/ADD
CH CAPTION/GUIDE
S VIDEO
VIDEO LABEL
>MENU

"AUTO PROGRAM" appears on the screen and receivable channels (other than the channels already preset) are preset in numerical sequence. The channels previously preset will not remain in the TV's memory.
When no more channels can be found, the programming stops and the lowest numbered channel is displayed.

To erase unnecessary channels, or to add channels that could not be preset automatically because their signal was too weak, follow the steps in "Erasing Unnecessary Channels—CHANNEL ERASE" (pp.19–20) and "Presetting Only Desired Channels—CHANNEL ADD" (p. 21).



RM-Y118

Erasing Unnecessary Channels—CHANNEL ERASE

Use this feature to erase unnecessary TV channels, so that when you press CH Δ or ∇ , the channel(s) are skipped.

- 1 Press MENU.
The main menu appears.



VIDEO
AUDIO
TIME
SET UP
CLOSED CAPTION
Use Δ (R) Exit (L)

- 2 Press Δ or ∇ to select SET UP.



VIDEO
AUDIO
TIME
SET UP
CLOSED CAPTION
Use Δ (R) Exit (L)

Press RETURN.
The SET UP menu appears.



SET UP
CABLE: ON
AUTO PROGRAM
CH ERASE/ADD
CH CAPTION/GUIDE
S VIDEO
VIDEO LABEL
>MENU

- 3 Press Δ or ∇ to select CH ERASE/ADD.



SET UP
CABLE: ON
AUTO PROGRAM
CH ERASE/ADD
CH CAPTION/GUIDE
S VIDEO
VIDEO LABEL
>MENU

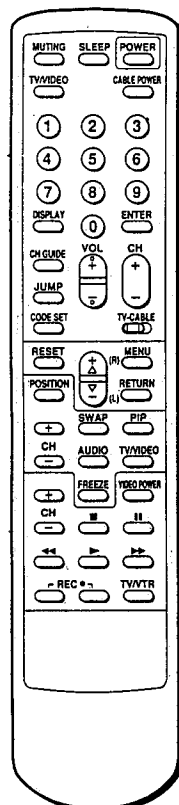
Press RETURN.
The CH ERASE/ADD screen appears, and the cursor points to "ERASE".



CH ERASE/ADD 10
ERASE
ADD
>MENU
Select the channel
Use Δ (R) Exit (L)

Note

If CH ERASE/ADD display appears in black, the TV is in video mode and you cannot select CH ERASE/ADD.
Press TV/VIDEO to change to TV mode.



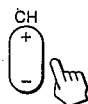
RM-Y118

To return to the normal screen
Press MENU.

Note

When you erase a VHF or UHF channel, the cable TV channel with the same number is also erased, and vice versa.

- 4** Press the CH +/- button to select the channel you want to erase.
For example, to erase channel 8, press CH +/- until 8 appears.



CH ERASE/ADD 8
▶ERASE
ADD
▶MENU
Select the channel
Use ◀ RETURN Exit ▶

Press RETURN.

A "-" sign appears in front of the channel number display, indicating that the channel is erased from the channel scan memory.



CH ERASE/ADD - 8
▶ERASE
ADD
▶MENU
Use ◀ RETURN Exit ▶

The next time you press the CH +/- buttons, channel 8 will be skipped.

To erase other channels
Repeat step 4.

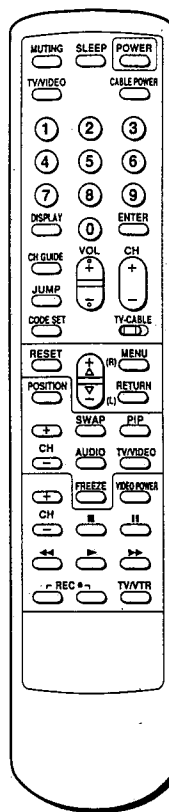
Cable TV channel chart*

Cable TV systems use letters or numbers to designate channels. To tune in a channel, refer to the chart below.

Number on this TV	Corresponding cable TV channel
1	A-8
5	A-7
6	A-6
14	A
15	B
16	C
17	D
18	E
19	F
20	G
21	H
22	I
23	J
24	K
25	L
26	M
27	N
28	O
29	P
30	Q
31	R
32	S

Number on this TV	Corresponding cable TV channel
33	T
34	U
35	V
36	W
37	W+1
38	W+2
39	W+3
93	W-57
94	W-58
95	A-5
96	A-4
97	A-3
98	A-2
99	A-1
100	W-59
101	W-60
102	W-61
123	W-82
124	W-83
125	W-84

* This designation of cable TV channels conforms to the EIA/NCTA recommendation. Check with your local cable TV company for more complete information on the available channels.



RM-Y118

To return to the normal screen
Press MENU.

Note

If you add a VHF or UHF channel, the cable TV channel with the same number is also added, and vice versa.

Presetting Only Desired Channels—CHANNEL ADD

Use this feature to add channels one by one to the channel scan memory.

- 1-3** (Follow steps 1-3 in "Erasing Unnecessary Channels—CHANNEL ERASE," p.19.)

Note

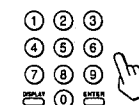
If the CH ERASE/ADD display appears in black, the TV is in video mode and you cannot select CHANNEL ERASE/ADD. Press TV/VIDEO to change to TV mode.

- 4** Press Δ + or ▽ - to select ADD.



CH ERASE/ADD 10
▶ERASE
ADD
▶MENU
Select the channel
Use ◀ RETURN Exit ▶

- 5** Press 0-9 and ENTER to select the channel you want to add.
For example, to add channel 25, press 2, 5 and ENTER.



CH ERASE/ADD 25
▶ERASE
ADD
▶MENU
Select the channel
Use ◀ RETURN Exit ▶

Press RETURN.

A "+" sign appears in front of the channel number display, indicating that the channel is added to the channel scan memory.

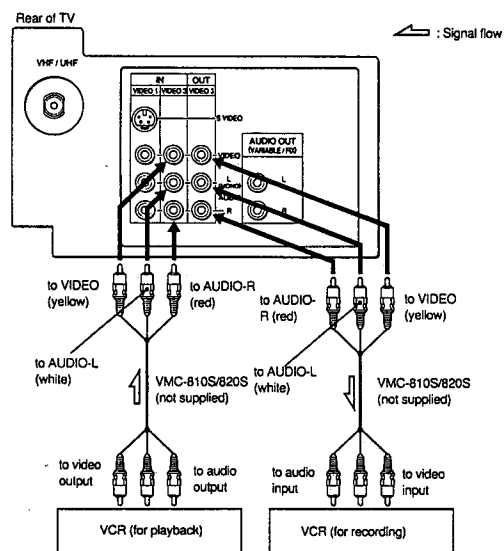


CH ERASE/ADD +25
▶ERASE
ADD
▶MENU
Use ◀ RETURN Exit ▶

To add other channels
Repeat step 5.

1-5. CONNECTING OTHER EQUIPMENT

Connecting two VCRs for tape editing (KV-27TS32 only)



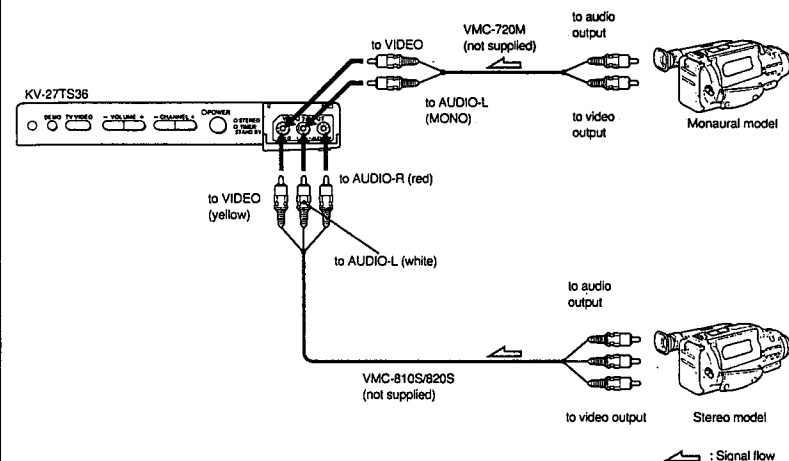
Watching a different image while duplicating

You can duplicate your recorded tapes by connecting two VCRs. The VIDEO 3 OUT jacks only output the signal from the VIDEO 3 IN jacks. Connect a VCR for playback to VIDEO 3 IN jacks, and a VCR for recording to the VIDEO 3 OUT jacks. You can watch a TV program or images from VIDEO 1 IN or VIDEO 2 IN during duplicating.

To watch a different input image
Press TV/VIDEO on the TV or on the Remote Commander to select the input image you want to watch.

Connecting camcorders (except for KV-27TS29/2970RS)

Playing back recorded tapes

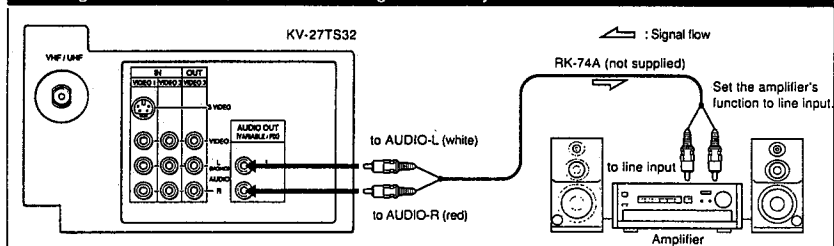


Preparing for use

Same as p. 23.

Audio System

Listening to TV or connected VCR sound through an audio system



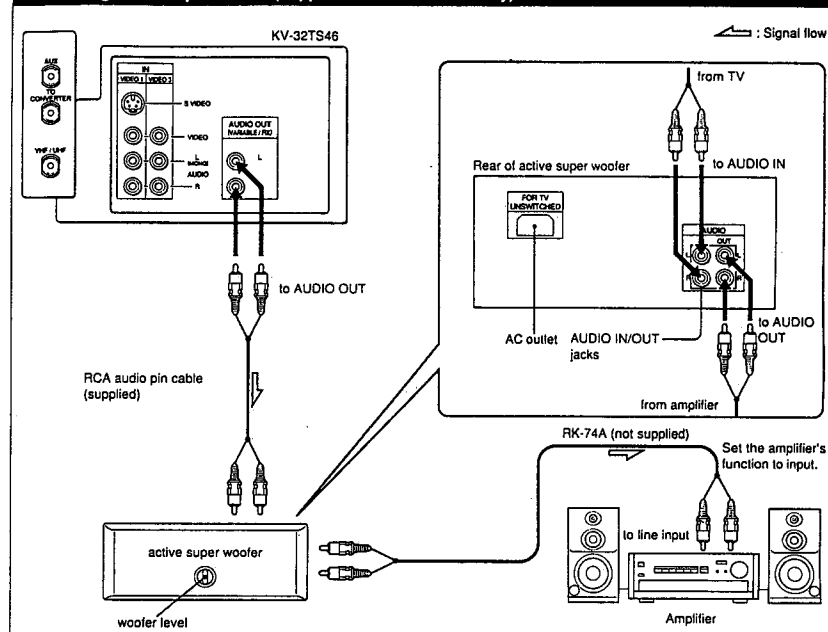
Preparing for use

Display the mode set menu and set SPEAKER to OFF to cut off the TV speaker sound (p. 37), and listen to the TV's sound solely through the audio system speakers.

Note

By setting AUDIO OUT variable, you can adjust the bass, treble and balance, or select surround or an MTS (Multichannel TV Sound) mode, using the on-screen menus (pp. 34–36).

Connecting active super woofer (supplied with KV-32TS46 only)



Preparing for use

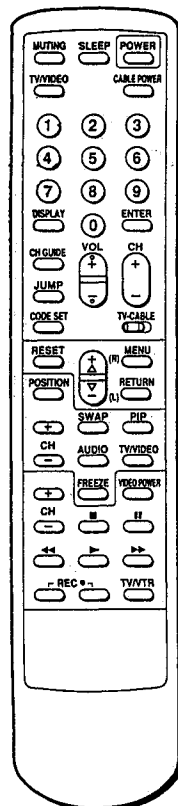
Same as p. 26.

Notes

- You should only connect the KV-32TS46 to the AC outlet on the active super woofer.
- To make the active super woofer stable, attach the felt feet (supplied) to the bottom.
- When you use the dedicated stand (not supplied), remove the rear panel of the stand.

Active Super Woofer Specification

Input : 500 mVrms (100% modulation)
Output : 500 mVrms (100% modulation)
Impedance: 47 kilohms
Power consumption:
9 W (100 Hz)
Dimensions: 435 x 165 x 164 mm (W x H x D)
(17 1/4 x 6 1/2 x 6 1/2 in.)
Weight : 3.9 kg
(8 lbs 10 oz)



RM-Y118

To return to the normal screen
Press MENU.

Note
If you set S VIDEO to ON, the TV
automatically receives S video signals
whenever a VCR with S video is connected.

Watching a Video with Your S Video-Equipped VCR (except for KV-27TS29/2970RS)

Use this feature to set S VIDEO to ON or OFF depending on the kind of video equipment you have connected to the TV. For instructions on connecting video equipment, see pp.22-25.

Note

If the TV is in TV, VIDEO 2 or VIDEO 3 mode, the S VIDEO display appears in black and cannot be selected.
Press TV/VIDEO to change to VIDEO 1 mode.

- 1 Press MENU.
The main menu appears.



▶VIDEO
AUDIO
TIME
SET UP
CLOSED CAPTION
Use Δ (R) Exit (L)

- 2 Press Δ or ∇ to select SET UP.



VIDEO
AUDIO
TIME
▶SET UP
CLOSED CAPTION
Use Δ (R) Exit (L)

Press RETURN.
The SET UP menu appears.



SET UP
▶CABLE: ON
AUTO PROGRAM
CH ERASE/ADD
CH CAPTION/GUIDE
S VIDEO: ON
VIDEO LABEL
▶MENU

- 3 Press Δ or ∇ to select S VIDEO.
Then press RETURN.



SET UP
CABLE: ON
AUTO PROGRAM
CH ERASE/ADD
CH CAPTION/GUIDE
▶S VIDEO: ON
VIDEO LABEL
▶MENU

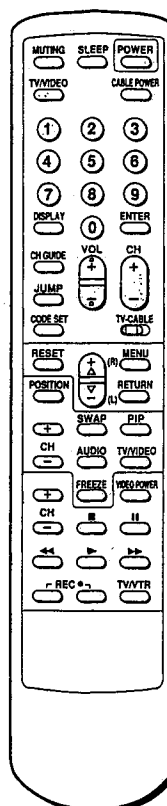
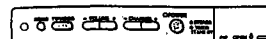
Press Δ or ∇ to select ON or OFF alternately.

SET UP
CABLE: ON
AUTO PROGRAM
CH ERASE/ADD
CH CAPTION/GUIDE
S VIDEO: ON
VIDEO LABEL
▶MENU

SET UP
CABLE: ON
AUTO PROGRAM
CH ERASE/ADD
CH CAPTION/GUIDE
S VIDEO: OFF
VIDEO LABEL
▶MENU

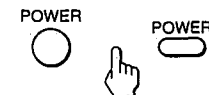
Press RETURN.
The setting is completed.

1-6. WATCHING TV PROGRAMS



RM-Y118

- 1 Press POWER on the TV or the Remote Commander to turn the TV on.
The TIMER/STAND BY indicator blinks until the picture appears.

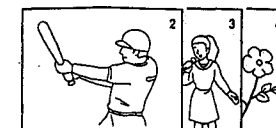
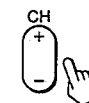


- 2 Turn the cable mode on or off to select the type of channel you want to watch, VHF/UHF or cable TV.
(Follow the steps in "Turning the Cable Mode On or Off," p. 17.)

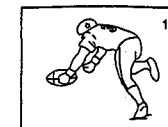
If "VIDEO" or "S VIDEO" is displayed on the screen, press the TV/VIDEO button on the TV or on the Remote Commander so that the channel number appears.

- 3 Select a channel in one of the following two ways:

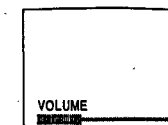
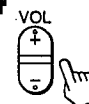
To scan the preset channels* in numerical sequence
Press CH +/-.



* For more information on presetting channels, see pp. 18 - 21.
To select a channel directly
Press 0 - 9 and ENTER.
For example, to select channel 14, press 1, 4 and ENTER.



- 4 Press VOL +/- to adjust the volume.

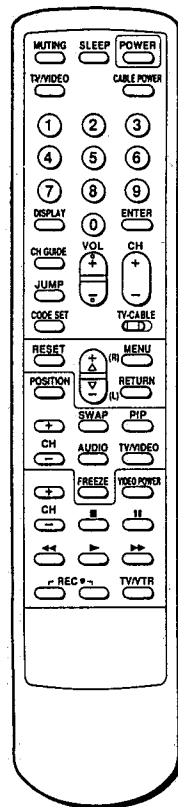


The display will disappear automatically after 3 seconds.

Press + to increase the volume.
Press - to decrease the volume.

To turn off the TV
Press POWER on the TV or the Remote Commander again.

1-7. USING CONVENIENT FEATURES



RM-Y118

Muting the Sound — MUTING

Press **MUTING**.
The display "MUTING" will appear on the screen.

To restore the sound
Press **MUTING** again, or press **VOL +**.



Keeping the Displays On-Screen — DISPLAY

To display the channel
Press **DISPLAY**.
All the existing displays appear: channel number, channel caption (if set), MTS mode ("SAP" only), window picture input mode and the current time ("AM" or "PM" disappears after about three seconds).



To cancel the display
Press **DISPLAY** again.
The channel display will disappear.

Using the Sleep Timer — SLEEP

The sleep timer turns off the TV automatically after the amount of time you select.

Press **SLEEP**.
Each time you press **SLEEP**, the time increments "30", "60", "90" and "OFF" mode appear in sequence.



SLEEP 30
SLEEP 60
SLEEP 90
SLEEP OFF

The **SLEEP** display appears about one minute before the TV turns off.

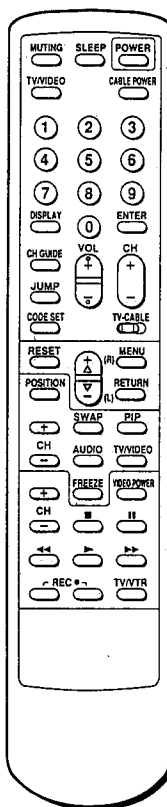
To cancel the setting
Press **SLEEP** until "OFF" mode appears.
The "SLEEP OFF" display appears for about three seconds.
OR
Turn the TV off.
The sleep timer setting is cancelled.

Switching Quickly Between Two Channels—JUMP

Press **JUMP** once to recall the channel you were watching previously. Press **JUMP** again to switch back. Use this feature to keep track of two programs alternately.



1-8. USING CLOSED CAPTION



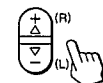
RM-Y118

1 Press **MENU**.
The main menu appears.



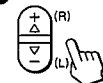
VIDEO
AUDIO
TIME
SET UP
CLOSED CAPTION
Use Δ (R) Exit (L)

2 Press Δ or ∇ to select **CLOSED CAPTION**.
Then press **RETURN**.
The **CLOSED CAPTION** screen appears.



CLOSED CAPTION
CC1/TEXT OFF
CC1
CC2
TEXT1
TEXT2
MENU
Use Δ (R) Exit (L)

3 Press Δ or ∇ to select closed caption mode.



Select **CC1** or **CC2** to view Captions.
A Caption is a printed version of the dialogue or sound effects of a program. (The mode should be set to **CC1** for most programs.)

CLOSED CAPTION
CC1/TEXT OFF
CC1
CC2
TEXT1
TEXT2
MENU
Use Δ (R) Exit (L)

Select **TEXT1** or **TEXT2** to view Text.
Text is information that is presented using the half to full television screen. It is usually not related to the program.

CLOSED CAPTION
CC1/TEXT OFF
CC1
CC2
TEXT1
TEXT2
MENU
Use Δ (R) Exit (L)

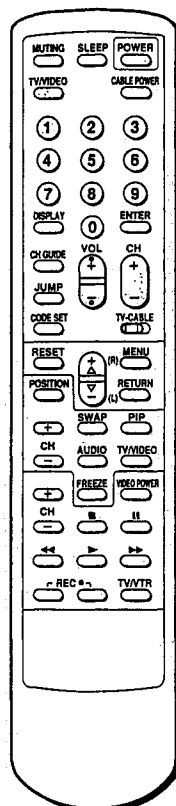
Select **CC/TEXT OFF** if you do not want to use the **CLOSED CAPTION** mode.

CLOSED CAPTION
CC1/TEXT OFF
CC1
CC2
TEXT1
TEXT2
MENU
Use Δ (R) Exit (L)

Press **RETURN**.
The setting is completed.



1-9. WATCHING TWO PICTURES AT ONCE (PICTURE-IN-PICTURE)



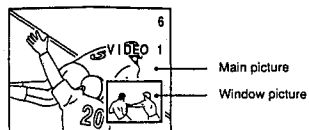
RM-Y118

Note

To operate your VCR with the supplied Remote Commander, See "Using the Pre-Programmed Remote Commander", pp. 55-57.

You can watch both the main picture and a window picture simultaneously by using the Picture-in-Picture (PIP) function. Model KV-32TS45 is equipped with two-tuner PIP, allowing you to watch two TV channels at once.

Other models are equipped with one-tuner PIP. To watch two different TV channels, you must first connect a VCR to the TV, to watch a second TV channel through the VCR tuner. (See "Connecting Other Equipment", pp. 22-27.)



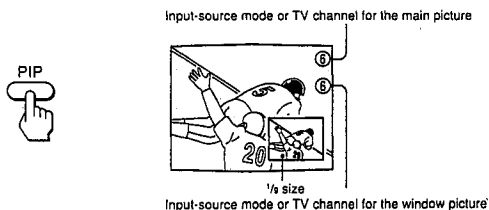
Picture-in-Picture special features

When watching the main picture and a window picture, you can:

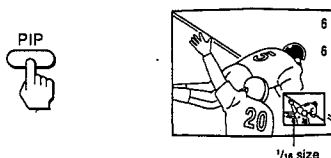
- Swap the main and window pictures (SWAP).
- Change the position of the window picture (POSITION).
- Display a still picture as a window (FREEZE).
- Choose the sound from the main or window picture (AUDIO).

Displaying a window picture—PIP

Press PIP to display a window picture



Press PIP again to display a smaller window picture



To disappear the window picture
Press PIP once more.

Changing the window picture input mode

1 Press PIP to display a window picture.



2 Press TV/VIDEO in the Picture-in-Picture control area to select the input mode.

Each time you press TV/VIDEO, "TV", "VIDEO 1", "VIDEO 2" and "VIDEO 3" appear in sequence.



A window picture will appear in the same input mode as the last time you used PIP.

To receive the window picture sound

Press AUDIO.

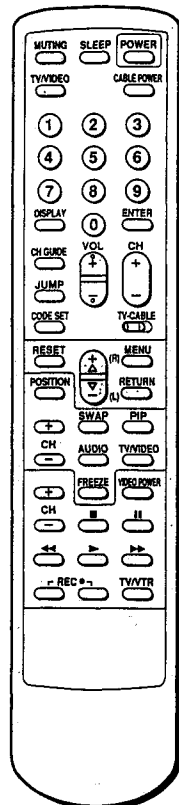
The display appears for a few seconds, indicating that the window picture sound is being received.



To restore the main picture sound
Press AUDIO again.

Notes

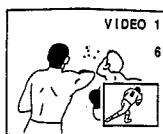
- If the main picture is not receiving an image, the window picture may be in black and white.
- When you turn PIP on or when you turn the TV on with PIP mode on the window picture will appear at the bottom right of the screen.
- The window picture may be affected by the condition of the main picture.
- The window picture sound is also output from the VARIABLE/FIX AUDIO OUT jacks.



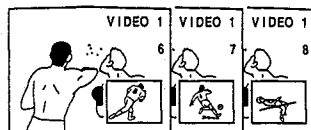
RM-Y118

Changing TV channels in the window picture

- 1 Press PIP to display a window picture.

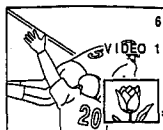


- 2 Press CH +/- in the PIP control area.

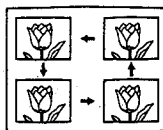


Changing the position of the window picture—POSITION

- 1 Press PIP to display a window picture.



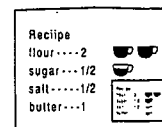
- 2 Press POSITION.
Each time you press POSITION, the window picture will move counterclockwise on the screen, as illustrated below.



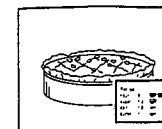
Displaying a still picture — FREEZE

Use the FREEZE function to display a still picture as a window. This function is useful when you want to write down a recipe from a cooking program, a displayed address or a phone number and so on.

- 1 Press PIP to display a window picture.



- 2 Press FREEZE.
The window picture image remains still on the screen.



To restore the normal picture
Press FREEZE again.

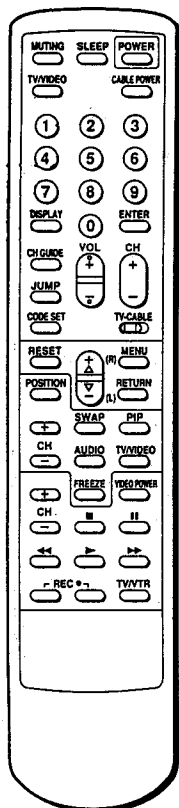
Swapping the main and window pictures — SWAP

- 1 Press PIP to display a window picture.



- 2 Press SWAP.
Each time you press SWAP, the images from the main and window pictures switch places.

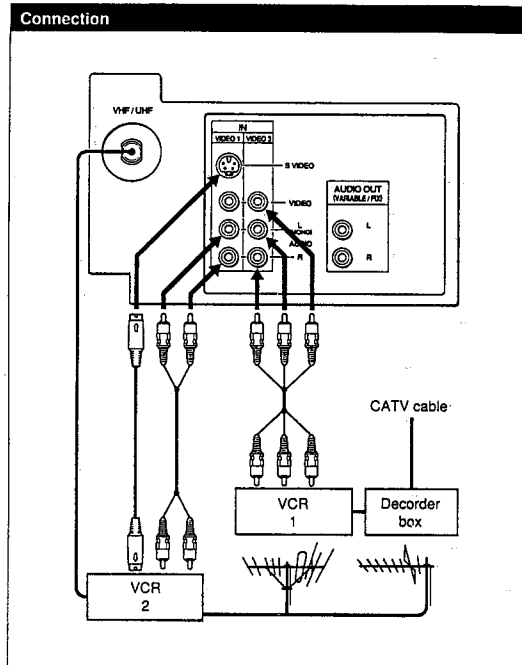




RM-Y118

Displaying a pay cable TV channel as a window picture

To display a pay cable TV channel as a window picture, connect your decoder box as illustrated below.



Note

The channels being received through the AUX terminal cannot be displayed as a window picture. (KV-32TS46 only)

After making the connections, turn the cable mode on by following the steps "Turning the Cable Mode On or Off", p. 17. Then continue with steps below.

- 1 Press PIP to display a window picture.



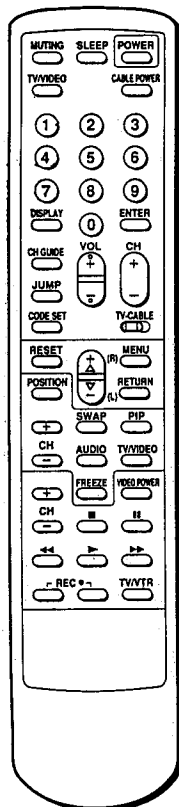
- 2 Press TV/VIDEO in the Picture-in-Picture control area to select the input mode.
Each time you press TV/VIDEO, "TV", "VIDEO 1", "VIDEO 2" and "VIDEO 3" appear in sequence.



- 3 Put your VCR on an inactive channel (CH 3 or 4).

- 4 Change pay cable TV channels with the decoder box.

1-10. USING THE TIMER-ACTIVATED FUNCTIONS



RM-Y118

Setting the Clock—CURRENT TIME SET

Follow these instructions to set the current time. The correct time must be set in order to use the timer-activated functions (ON/OFF TIMER, CHANNEL BLOCK).

EXAMPLE: Set the time to 3:15 PM, Monday.

- 1** Press MENU.
The main menu appears.



VIDEO
AUDIO
TIME
SET UP
CLOSED CAPTION
Use Δ RETURN Exit

- 2** Press Δ or ∇ to select TIME.



VIDEO
AUDIO
TIME
SET UP
CLOSED CAPTION
Use Δ RETURN Exit

Press RETURN.
The TIME menu appears, and the cursor points to "CURRENT TIME SET".



TIME
CURRENT TIME SET
ON/OFF TIMER
CHANNEL BLOCK
MENU
Use Δ RETURN Exit

- 3** Press RETURN.
The CURRENT TIME SET screen appears.



CURRENT TIME SET
MON 12:00 AM
MENU
Use Δ RETURN Exit

- 4** Press RETURN again.
"Set the day," appears on the screen.



CURRENT TIME SET
SUN 12:00 AM
MENU
Set the day.
Use Δ RETURN Exit

- 5** Press Δ or ∇ to set the day.
Each time you press Δ or ∇ , the day changes consecutively.



Press RETURN.
"Set the time," appears on the screen.



CURRENT TIME SET
MON 12:00 AM
MENU
Set the time.
Use Δ RETURN Exit

- 6** Press Δ or ∇ to set the hour.
Each time you press Δ or ∇ , the hour changes starting with "12:00 AM."



Press RETURN.



CURRENT TIME SET
MON 3:00 PM
MENU
Set the time.
Use Δ RETURN Exit

- 7** Press Δ or ∇ to set the minutes.
Each time you press Δ or ∇ , the minutes change in sequence.



Press RETURN.
The setting is completed, and the clock starts.



CURRENT TIME SET
MON 3:15 PM
MENU
Set the time.
Use Δ RETURN Exit

CURRENT TIME SET
MON 3:15 PM
MENU
Use Δ RETURN Exit

To reset the time
Press RESET while in the CURRENT TIME screen, and repeat steps 4–7.

To display the time
Press DISPLAY.

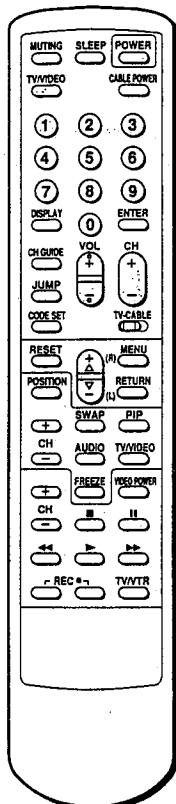
To return to the normal screen
Press MENU.

Notes

- The internal clock of this TV operates on a 12-hour cycle. If a 24-hour cycle number (for instance, 13:00) is entered, it will be cleared when you press RETURN.

12:00 AM stands for midnight.
12:00 PM stands for noon.

- All the settings including CURRENT TIME SET will be erased if you unplug the TV or a power failure occurs. Reset the current time by following steps 1–7.



RM-Y118

Setting the ON/OFF TIMER

With this function you can set your favorite program to appear on the screen at the time that you set.

EXAMPLE: Set the timer to turn on the TV every Monday through Friday at 3:15 PM for 2 hours, on channel 21.

- 1** Press MENU.
The main menu appears.



VIDEO
AUDIO
TIME
SET UP
CLOSED CAPTION
Use Δ RETURN Exit

- 2** Press Δ or ∇ to select TIME.
Then press RETURN.
The TIME menu appears.



TIME
CURRENT TIME SET
ON/OFF TIMER
CHANNEL BLOCK
MENU
MON 3:15 PM
Use Δ RETURN Exit

- 3** Press Δ or ∇ to select ON/OFF TIMER.
Then press RETURN.
The ON/OFF TIMER screen appears.



ON/OFF TIMER
EVERY SUN-SAT
12:00AM _h CH____
MENU
Use Δ RETURN Exit

Note

If the ON/OFF TIMER display appears in black, the current time has not been set and you cannot select ON/OFF TIMER. To set the clock, see "Setting the Clock—CURRENT TIME SET", pp. 44-45.

- 4** Press RETURN again.
"Set the day." appears on the screen.



ON/OFF TIMER
EVERY SUN-SAT
12:00AM _h CH____
MENU
Set the day.
Use Δ RETURN Exit

- 5** Press Δ or ∇ to set the day.
Each time you press Δ or ∇ , the days of the week change as shown in Fig. 1.
Then press RETURN.
"Set the time." appears on the screen.



ON/OFF TIMER
EVERY MON-FRI
12:00AM _h CH____
MENU
Set the time.
Use Δ RETURN Exit

- 6** Press Δ or ∇ to set the hour that you want the TIMER to start.
Each time you press Δ or ∇ , the hour changes in sequence.
Then press RETURN.



ON/OFF TIMER
EVERY MON-FRI
3:00PM _h CH____
MENU
Set the time.
Use Δ RETURN Exit

- 7** Press Δ or ∇ to set the minutes.
Each time you press Δ or ∇ , the minutes change in sequence.
Then press RETURN.
"Set the duration." appears on the screen.



ON/OFF TIMER
EVERY MON-FRI
3:15PM _h CH____
MENU
Set the duration.
Use Δ RETURN Exit

- 8** Press Δ or ∇ to set the duration of time.
Each time you press Δ or ∇ , the duration changes from "1" to "6" in sequence.
Then press RETURN.
"Select the channel" appears on the screen.



ON/OFF TIMER
EVERY MON-FRI
3:15PM 2h CH____
MENU
Select the channel
Use Δ RETURN Exit

- 9** Press Δ or ∇ to set the channel that you want the TV to tune in.
Each time you press Δ or ∇ , the channel number changes from 1 to 125 in sequence.



ON/OFF TIMER
EVERY MON-FRI
3:15PM 2h CH 21
MENU
Select the channel
Use Δ RETURN Exit

Press RETURN.
The setting is completed, and the TIMER indicator on the front of the TV lights up.



ON/OFF TIMER
EVERY MON-FRI
3:15PM 2h CH 21
MENU
Use Δ RETURN Exit

To clear the ON/OFF TIMER setting
Press RESET while in the ON/OFF TIMER screen.

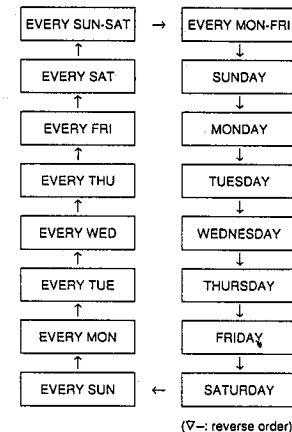
To return to the normal screen
Press MENU.

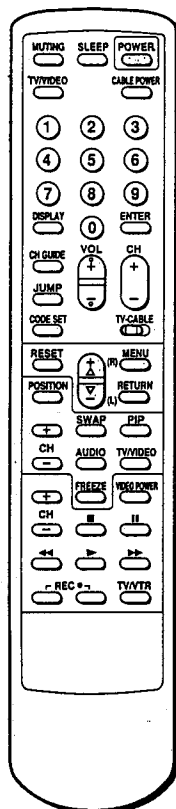
Notes

- While the TIMER is set, the TIMER indicator on the TV is on.
- One minute before the timer goes off, the "TV will turn off" display will appear on the screen.
- All the settings including ON/OFF TIMER will be erased if you unplug the TV or a power failure occurs. Reset the ON/OFF TIMER by following steps 1-9.
- If you have not set the clock correctly, the ON/OFF TIMER will not operate at the proper time. To set the clock, see "Setting the Clock—CURRENT TIME SET", pp. 44-45.

Fig. 1

Selecting the day(s) of the week
When you press Δ , the days of the week appear in the following order.





RM-Y118

Setting CHANNEL BLOCK

Use this function to block a channel from appearing on the screen during the time you specify. You can use this function to prevent children from watching undesirable programs.

EXAMPLE: Set CHANNEL BLOCK every Sunday at 8:45 PM for one hour, on channel 38.

- 1** Press MENU.
The main menu appears.



▶VIDEO
AUDIO
TIME
SET UP
CLOSED CAPTION
Use Δ (R) Exit ∇ (L)

- 2** Press Δ or ∇ to select TIME.
Then press RETURN.
The TIME menu appears.



TIME
▶CURRENT TIME SET
ON/OFF TIMER
CHANNEL BLOCK
▶MENU
MON 3:15 PM
Use Δ (R) Exit ∇ (L)

- 3** Press Δ or ∇ to select CHANNEL BLOCK.
Then press RETURN.
The CHANNEL BLOCK screen appears.



CHANNEL BLOCK
▶EVERY SUN-SAT
12:00AM _h CH____
▶MENU
Use Δ (R) Exit ∇ (L)

Note

If the CHANNEL BLOCK display appears in black, the current time has not been set and you cannot select CHANNEL BLOCK. To set the clock, see "Setting the Clock—CURRENT TIME SET", pp. 44-45.

- 4** Press RETURN again.
"Set the day." appears on the screen.



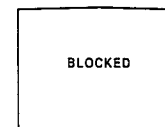
CHANNEL BLOCK
▶EVERY SUN-SAT
12:00AM _h CH____
▶MENU
Set the day.
Use Δ (R) Exit ∇ (L)

- 5** Press Δ or ∇ to set the day.
Each time you press Δ or ∇ , the days of the week change as shown in Fig. 1. (See p. 47.)
Then press RETURN.
"Set the time." appears on the screen.



CHANNEL BLOCK
SUNDAY
12:00AM _h CH____
▶MENU
Set the time.
Use Δ (R) Exit ∇ (L)

If you select a channel which has been blocked, the message of "BLOCKED" appears.



- 6** Press Δ or ∇ to set the hour.
Each time you press Δ or ∇ , the hour changes in sequence.
Then press RETURN.



CHANNEL BLOCK
SUNDAY
8:00AM _h CH____
▶MENU
Set the time.
Use Δ (R) Exit ∇ (L)

To clear the BLOCK setting
Press RESET while in the CHANNEL BLOCK screen.

To return to the normal screen
Press MENU.

Notes

- If you set a new CHANNEL BLOCK by following steps 1-9, the original setting will be erased.
- If you have not set the clock correctly, CHANNEL BLOCK will not operate at the proper time. To set the clock, see "Setting the Clock—CURRENT TIME SET", pp. 44-45.

- 7** Press Δ or ∇ to set the minutes.
Each time you press Δ or ∇ , the minutes change in sequence.
Then press RETURN.
"Set the duration." appears on the screen.



CHANNEL BLOCK
SUNDAY
8:45PM _h CH____
▶MENU
Set the duration.
Use Δ (R) Exit ∇ (L)

- 8** Press Δ or ∇ to set the duration of time that you want the TV remain blocked.
Each time you press Δ or ∇ , the duration changes from 1 to 6 in sequence.
Then press RETURN.
"Select the channel" appears on the screen.



CHANNEL BLOCK
SUNDAY
8:45PM 1h CH____
▶MENU
Select the channel
Use Δ (R) Exit ∇ (L)

- 9** Press Δ or ∇ to set the channel that you want to block.
Each time you press Δ or ∇ , the channel number changes from 1 to 125 in sequence.



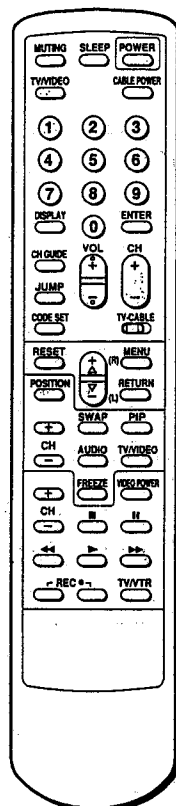
Press RETURN.
The setting is completed.



CHANNEL BLOCK
SUNDAY
8:45PM 1h CH 38
▶MENU
Select the channel
Use Δ (R) Exit ∇ (L)

CHANNEL BLOCK
▶SUNDAY
8:45PM 1h CH 38
▶MENU
Use Δ (R) Exit ∇ (L)

1-11. CUSTOMIZING THE SCREEN DISPLAY



RM-Y118

Setting Channel Captions — CH CAPTION

Use this feature to caption up to 12 channel number displays with the matching channel call letters.

EXAMPLE: Caption channel 20 with ESPN at the caption position number 4.

- 1** Press MENU.
The main menu appears.



VIDEO
AUDIO
TIME
SET UP
CLOSED CAPTION
Use Δ RETURN Exit

- 2** Press Δ or ∇ to select SET UP.
Then press RETURN.
The SET UP menu appears.



SET UP
CABLE: ON
AUTO PROGRAM
CH ERASE/ADD
CH CAPTION/GUIDE
S VIDEO
VIDEO LABEL
MENU

- 3** Press Δ or ∇ to select CH CAPTION/GUIDE.
Then press RETURN.
The CH CAPTION/GUIDE screen appears.



CH CAPTION/GUIDE
1 2 3
4 5 6
7 8 9
0
Select the letter.
Use Δ RETURN Exit

Note

If the CH CAPTION display appears in black, the TV is in video mode and you cannot select CH CAPTION/GUIDE. Press TV/VIDEO to change to TV mode.

- 4** Press RETURN again.
"Select a position." appears on the screen.



CH CAPTION/GUIDE
1 2 3
4 5 6
7 8 9
0
Select a position.
Use Δ RETURN Exit

- 5** Press Δ or ∇ to select a caption position number.
Each time you press Δ or ∇ , the caption position number is marked in sequence.
Then press RETURN.
"Select the channel" appears on the screen.



CH CAPTION/GUIDE
1 2 3
4 5 6
7 8 9
0
Select the channel.
Use Δ RETURN Exit

- 6** Press Δ or ∇ to select the channel you want to caption.
Each time you press Δ or ∇ , the channel number changes from 1 to 125.
Then press RETURN.
"Select the letter." appears on the screen.



CH CAPTION/GUIDE
1 2 3
4 5 6
7 8 9
0
Select the letter.
Use Δ RETURN Exit

- 7** Press Δ or ∇ to select the first letter.
Each time you press Δ or ∇ , "0-9", "A-Z", "8", "I", "-" and "(blank space)" appear in sequence.



CH CAPTION/GUIDE
1 2 3
4 5 6
7 8 9
0
Select the letter.
Use Δ RETURN Exit

- 8** Repeat step 7 to select each remaining letter.
(For a 3-letter caption, leave a space by pressing RETURN only.)



CH CAPTION/GUIDE
1 2 3
4 5 6
7 8 9
0
Select the letter.
Use Δ RETURN Exit

- 9** Press RETURN.
The setting is completed.

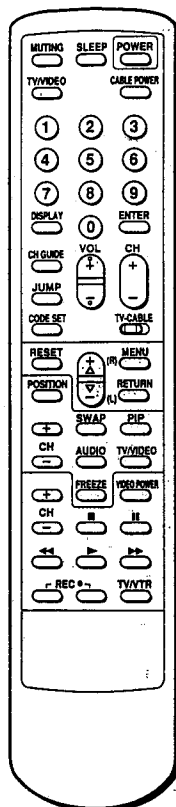


CH CAPTION/GUIDE
1 2 3
4 5 6
7 8 9
0
Select the letter.
Use Δ RETURN Exit

To caption other channels
Repeat steps 4-9.

To erase unneeded captions
Call the caption setting screen by following steps 1-5, and press RESET.

To return to the normal screen
Press MENU.



RM-Y118

Viewing the Captioned Channels — CH GUIDE

Use this feature to display the captions you set, and to select a channel directory for viewing.

- 1 Press CH GUIDE.
A directory appears, corresponding to the directory keys on the Remote Commander.

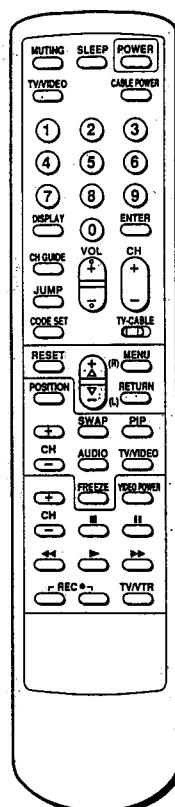
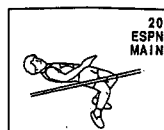
CH GUIDE



CHANNEL GUIDE									
①	ABC	②	DIS	③	CNN				
④	ESPN	⑤		⑥					
⑦		⑧		⑨					
⑩		⑪		⑫					

To cancel the CHANNEL GUIDE screen
Press CH GUIDE again.

- 2 Press the directory key of the channel you want to watch.



RM-Y118

- 4 Press Δ+ or ∇- to select the input mode you want to label.



Press RETURN.



VIDEO LABEL									
▶	VIDEO1:	VIDEO1							
	VIDEO2:	VIDEO2							
	VIDEO3:	VIDEO3							
	▶	MENU							
Use Δ+ RETURN Exit									

- 5 Press Δ+ or ∇- to select VHS.



Each time you press Δ+, the label changes:

VIDEO 1
VIDEO 1 → S VIDEO → BETA → 8 mm → VHS → LD

VIDEO 2
VIDEO 2 → BETA → 8 mm → VHS → LD

VIDEO 3
VIDEO 3 → BETA → 8 mm → VHS → LD

(∇-: reverse order)

Press RETURN.



VIDEO LABEL									
▶	VIDEO1:	VHS							
	VIDEO2:	VIDEO2							
	VIDEO3:	VIDEO3							
	▶	MENU							
Use Δ+ RETURN Exit									

To label other input modes
Repeat steps 4-5.

To return to the normal screen
Press MENU.

1-12. USING THE PRE-PROGRAMMED REMOTE COMMANDER

Manufactures and Code Numbers (VCR/video disc player)

Manufacturer	Code number
SONY	01, 02, 03, 04
CANON	05
EMERSON	22, 30, 33
FISHER	10, 11, 12, 15
FUNAI	29
GENERAL ELECTRIC	05, 08
GOLDSTAR	25
HITACHI	07, 08
JVC	16
MAGNAVOX	05, 06, 09
MITSUBISHI	18, 19, 26, 27
MULTITECH	29
NEC	16, 23, 31
PANASONIC	05, 06
PHILCO	05, 06
PHILIPS	05, 06, 09
QUASAR	05, 06
RCA	07, 08
SAMSUNG	24, 32
SANYO	11, 15
SCOTT	21
SHARP	13, 14
SHINTOM	34
SYLVANIA	05, 06, 09
SYMPHONIC	29
TEKNIKA	28, 29
TOSHIBA	20, 21
TOTE VISION	25
ZENITH	17

The code numbers for Sony equipment are assigned as follows:

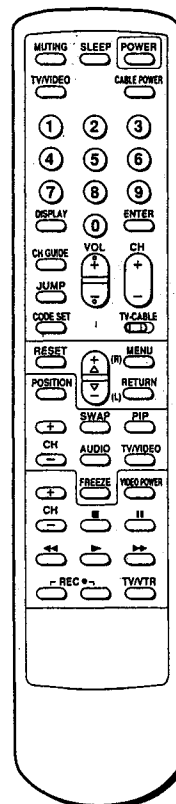
01 Beta, ED Beta VCR
 02 8 mm VCR
 03 VHS VCR
 04 Video disc player

Notes

- If more than one code number is listed for manufacturers other than Sony, try entering them one by one, until you come to the correct code for your equipment.
- If the video equipment does not have a certain function, the corresponding button on this Remote Commander will not operate.
- In some rare cases, you may not be able to operate your non-Sony video equipment with the supplied Remote Commander. This is because your equipment may use a code that is not provided with this Remote Commander. In this case, please use the equipment's own remote control unit.

CAUTION

When you remove the batteries from the Remote Commander, all the settings will revert to the Sony Beta setting. Reset the codes by following the steps on p. 55.



RM-Y118

Manufactures and Code Numbers (cable box)

MANUFACTURER	CODE
JERROLD	60, 61, 62, 63, 64, 65
PIONEER	69, 70
SCIENTIFIC ATLANTA	66, 67
TOCOM	71, 72
ZENITH	68

Operating a Cable Converter Box

Follow these instructions to set the manufacturer's code which will enable you to operate a connected cable converter box with the pre-programmed Remote Commander.

EXAMPLE: Operate a connected Zenith cable converter box.

- 1 Set the TV/CABLE selector to CABLE.



Notes

- If more than one code number is listed, try entering them one by one until you come to the correct code for your equipment.
- If you enter a new code number, the code number you previously entered at that setting is erased.
- In some rare cases, your equipment may use a code that is not provided with this Remote Commander and you may not be able to operate your cable converter box with the supplied Remote Commander. In this case, use the equipment's own remote control unit.

- 2 While pressing CODE SET, press 6 and 8 (Zenith's code number - see chart below) and ENTER.

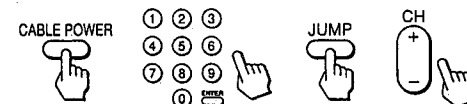


A long beep sounds, indicating that the code has been set.

Note

If you press a wrong code or if the code has not been set, four short beeps sound. Repeat step 2 to set the code.

- 3 Use CABLE POWER and the TV control buttons (0 - 9, ENTER, JUMP and CH +/-) to operate the cable converter box.



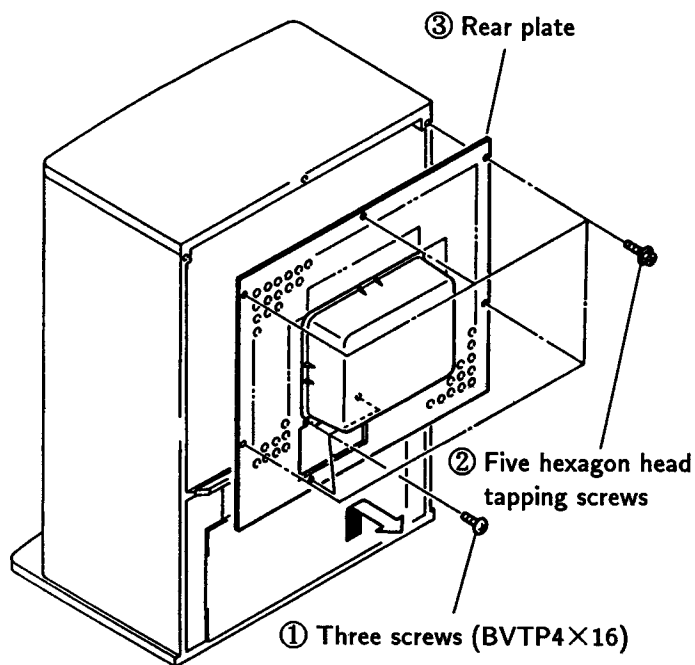
To operate the TV

Set the TV/CABLE selector to TV, then use the TV control buttons to control the TV.

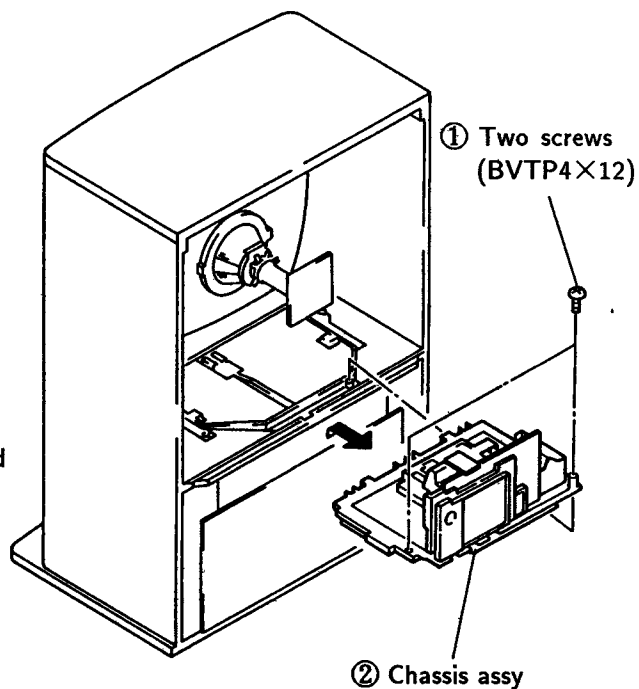
For more details on operating the cable box
 Refer to the operating instructions that come with the cable box.

SECTION 2 DISASSEMBLY

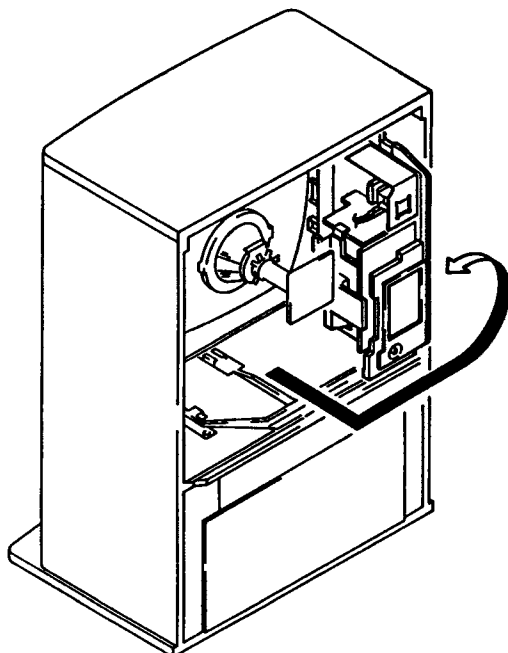
2-1. REAR PLATE REMOVAL



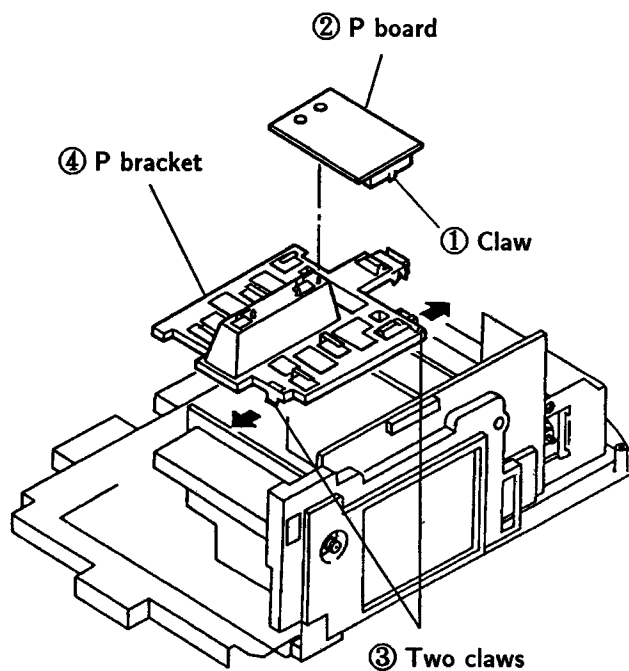
2-2. CHASSIS ASSY REMOVAL



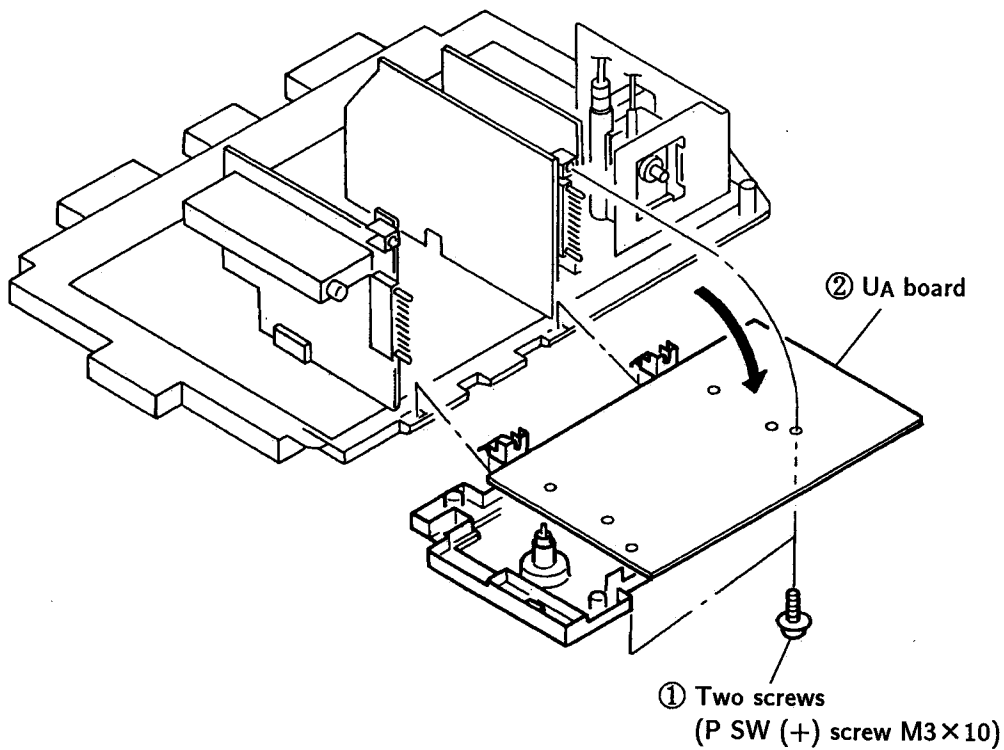
2-3. SERVICE POSITION



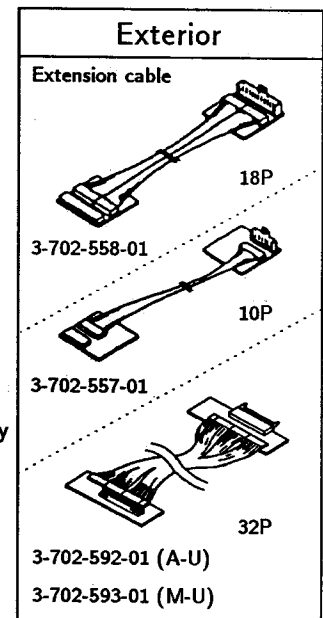
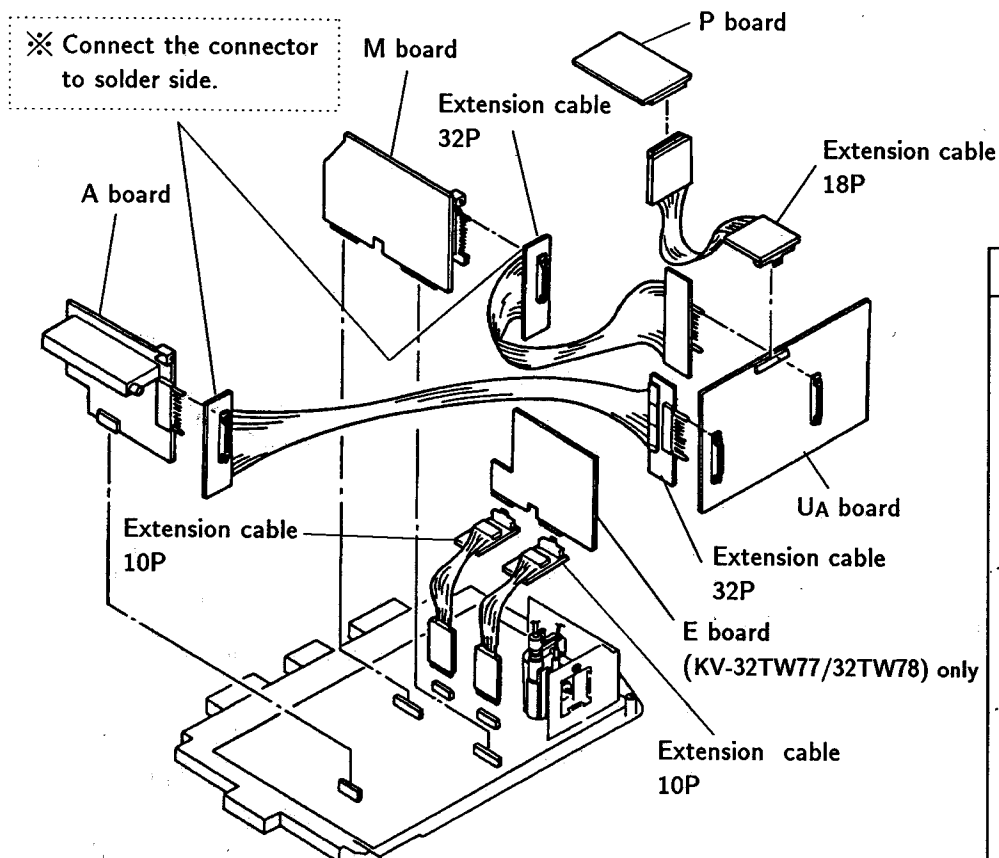
2-4. P BOARD AND P BRACKET REMOVAL



2-5. UA BOARD REMOVAL

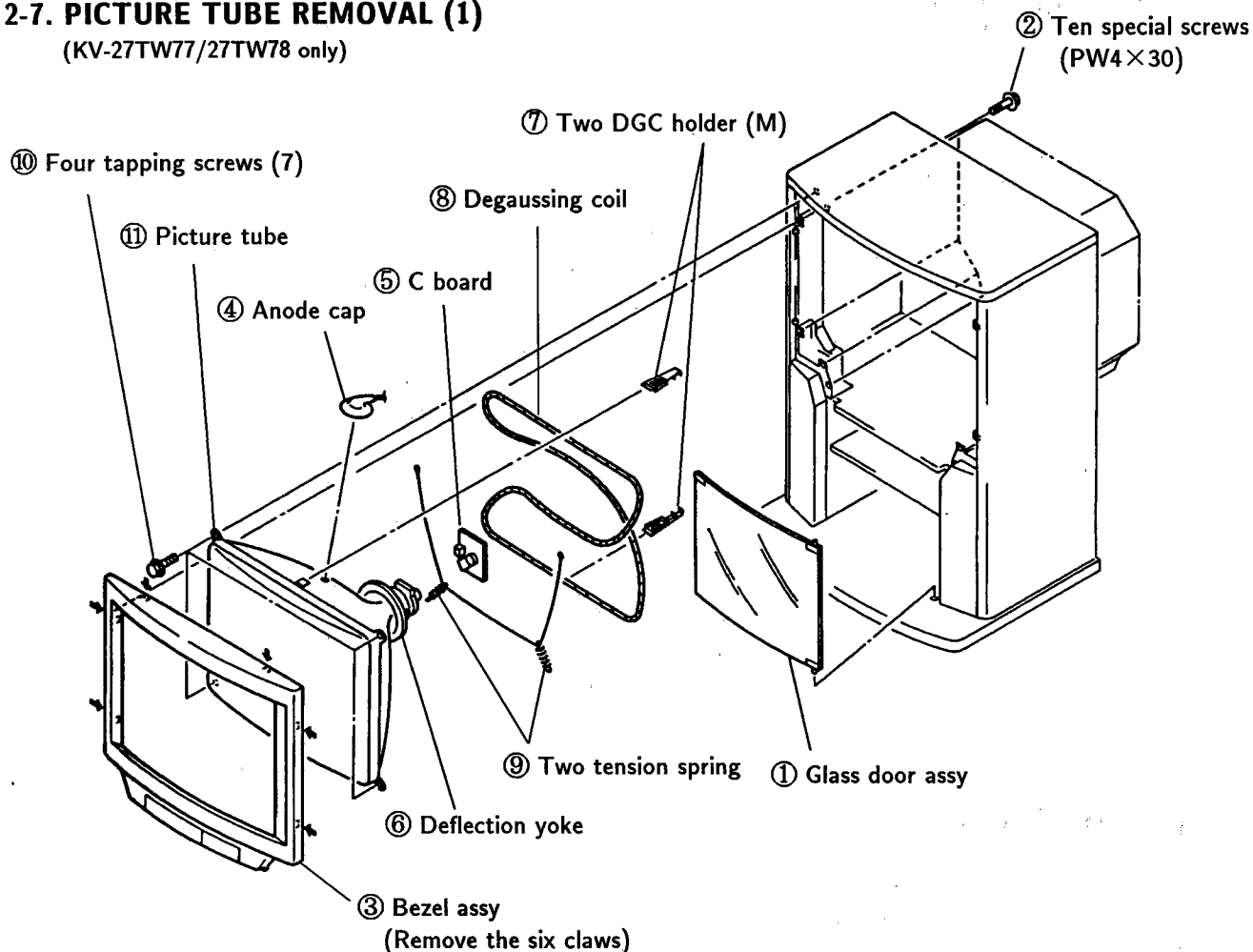


2-6. EXTENSION CABLE



2-7. PICTURE TUBE REMOVAL (1)

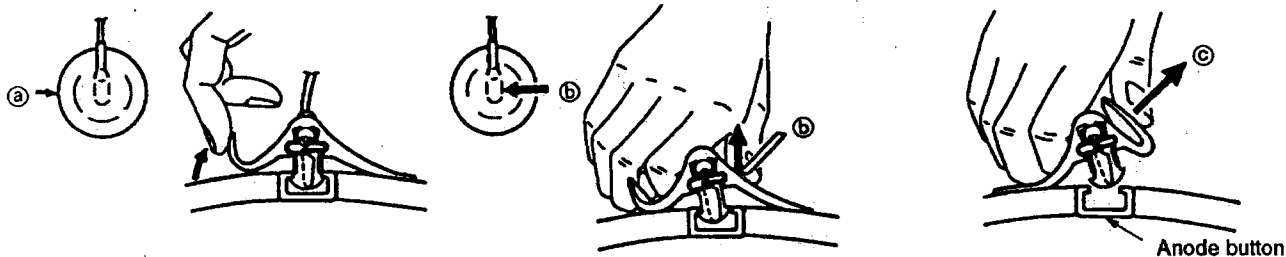
(KV-27TW77/27TW78 only)



• REMOVAL OF ANODE-CAP

NOTE : Short circuit the anode of the picture tube and the anode cap to the metal chassis, CRT shield or carbon painted on the CRT, after removing the anode.

• REMOVING PROCEDURES



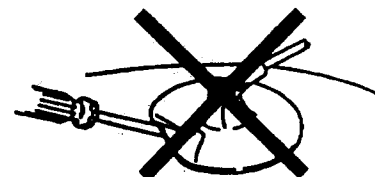
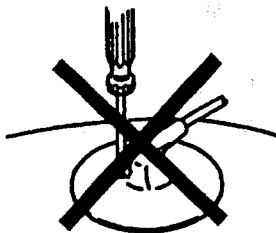
① Turn up one side of the rubber cap in the direction indicated by the arrow ②.

② Using a thumb pull up the rubber cap firmly in the direction indicated by the arrow ②.

③ When one side of the rubber cap is separated from the anode button, the anode-cap can be removed by turning up the rubber cap and pulling up it in the direction of the arrow ③.

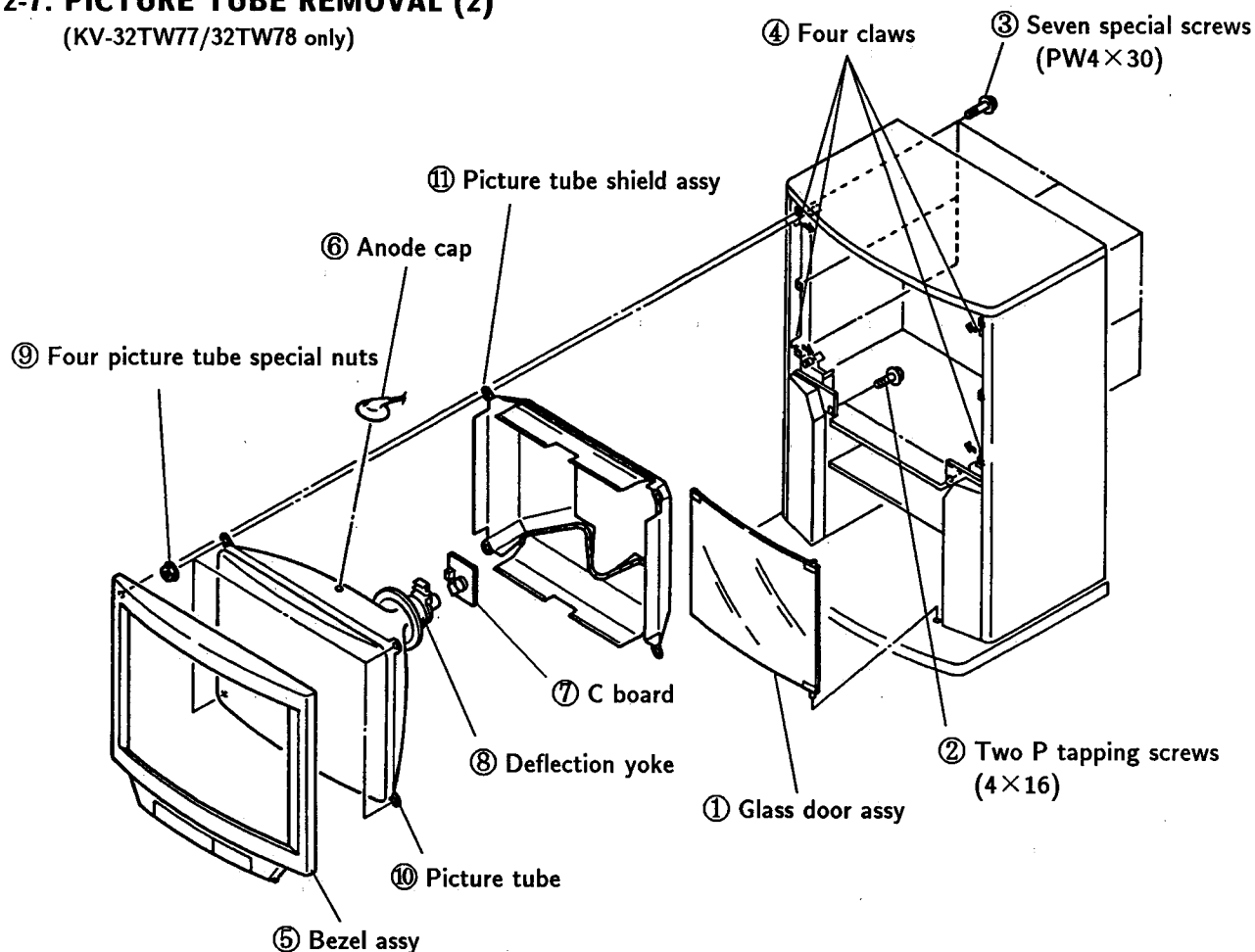
• HOW TO HANDLE AN ANODE-CAP

- ① Don't hurt the surface of anode-caps with sharp shaped material!
- ② Don't press the rubber hardly not to hurt inside of anode-caps!
A material fitting called as shatter-hook terminal is built in the rubber.
- ③ Don't turn the foot of rubber over hardly!
The shatter-hook terminal will stick out or hurt the rubber.



2-7. PICTURE TUBE REMOVAL (2)

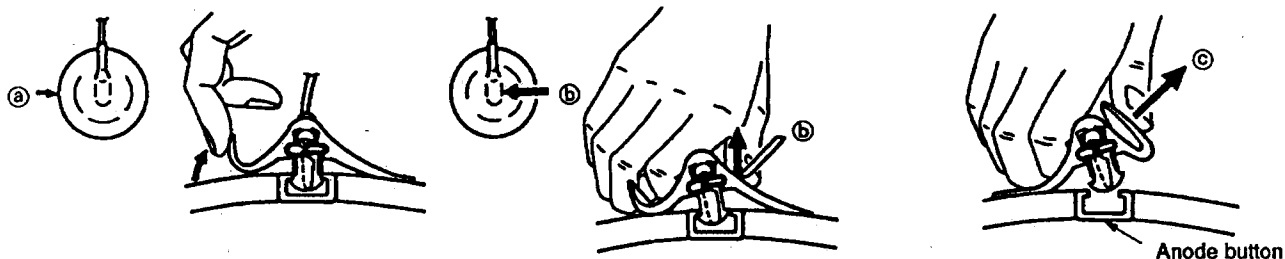
(KV-32TW77/32TW78 only)



• REMOVAL OF ANODE-CAP

NOTE : Short circuit the anode of the picture tube and the anode cap to the metal chassis, CRT shield or carbon painted on the CRT, after removing the anode.

• REMOVING PROCEDURES



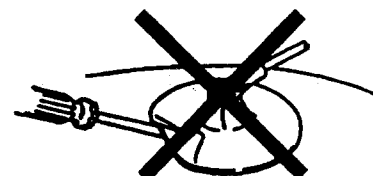
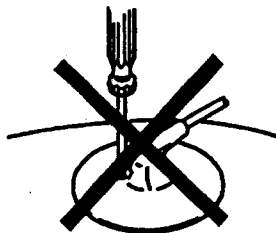
① Turn up one side of the rubber cap in the direction indicated by the arrow ①.

② Using a thumb pull up the rubber cap firmly in the direction indicated by the arrow ②.

③ When one side of the rubber cap is separated from the anode button, the anode-cap can be removed by turning up the rubber cap and pulling up it in the direction of the arrow ③.

• HOW TO HANDLE AN ANODE-CAP

- ① Don't hurt the surface of anode-caps with sharp shaped material!
- ② Don't press the rubber hardly not to hurt inside of anode-caps!
A material fitting called as shatter-hook terminal is built in the rubber.
- ③ Don't turn the foot of rubber over hardly!
The shatter-hook terminal will stick out or hurt the rubber.



2-8. REPAIR OF CHIP COMPONENT CIRCUIT BOARD

2-8-1. POINTS OF COMPONENT REMOVAL

Handling of blower type soldering iron

If hot blast is too strong or applied from a slanting direction, small components and solder near the component being removed can be blown off. Do not use blower type without temperature control.

2-8-2. NOTES ON SOLDERING FOR CHIP COMPONENTS

- 1) During soldering a chip component, if a soldering iron is applied for a long time, the heat may damage the component or cause pattern peeling.
- 2) Do not reuse a removed component. The characteristics of such a component may deteriorate.
- 3) Use wire solder containing silver (ϕ 0.3 or ϕ 0.6). (The pin electrodes of the laminated chip capacitor are silver + palladium, so if wire solder which does not contain silver is used, the silver of the pin electrode will be sucked into the solder.)

2-8-3. REMOVAL AND MOUNTING OF COMPONENTS

Chip resistor and chip capacitor

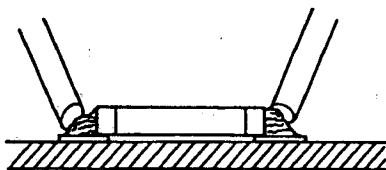
REMOVAL

- Using two soldering irons

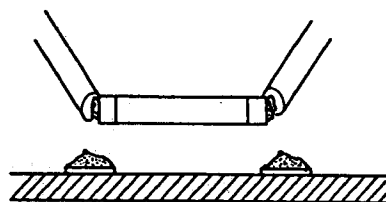
1) Mounted state



2) Melt the solder.

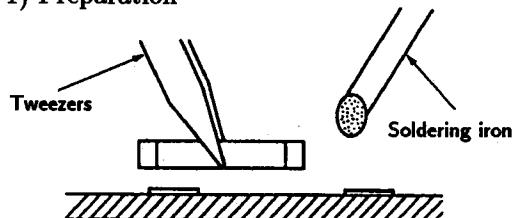


3) Remove the component.



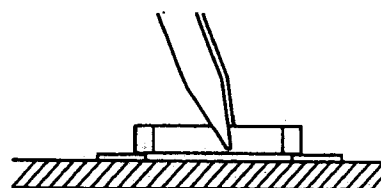
SOLDERING

1) Preparation

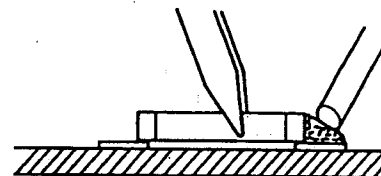


2) Location

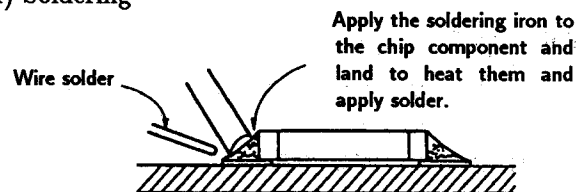
Be careful not to misposition.



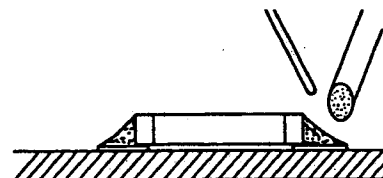
3) Tack soldering and flux application



4) Soldering



5) Soldering (Fix the fillet.)



6) Visual inspection

Check for the following defects :

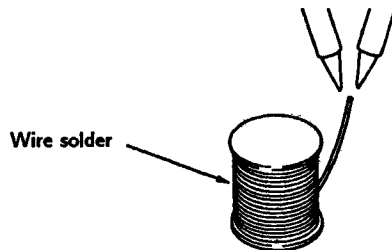
- No-soldered part
- Bridge (to other components or lands)
- Mispositioning
- Other defects

2-8-4. MINI-TRANSISTOR

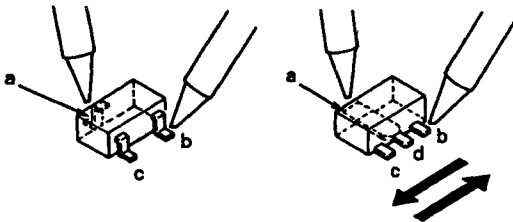
REMOVAL

- Using two soldering irons

1) Put a little solder on the tip of two soldering irons.

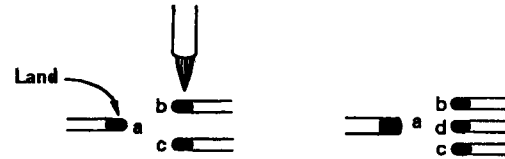


2) Apply the tip of one soldering iron to the point "a" and the other to the points "b" → "c" (or "b" → "d" → "c") and move the component in the directions indicated by arrows in the figure to remove it.

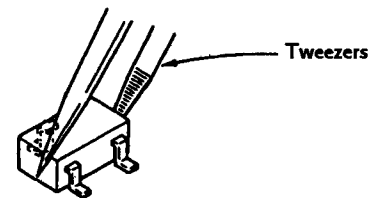


MOUNTING

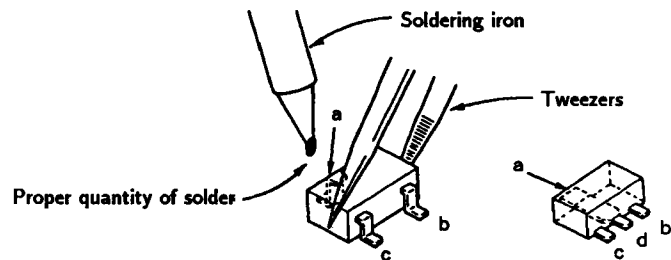
1) Apply a little flux to the land with a brush.



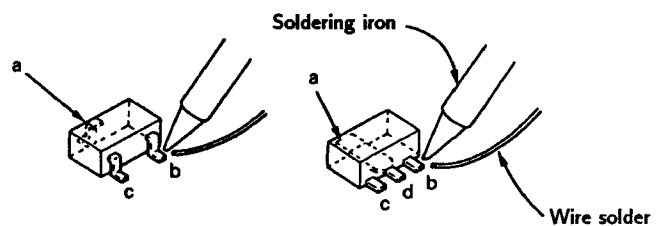
2) Place the component in position using tweezers.



3) Put a little solder on the tip of the soldering iron and solder the point "a" to fix the component.

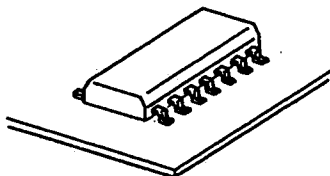
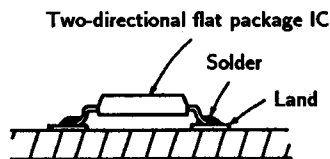


4) Bring the tip of the soldering iron and the wire solder close to the point to be soldered. Solder the points "b" → "c" (or "b" → "d" → "c") in order.



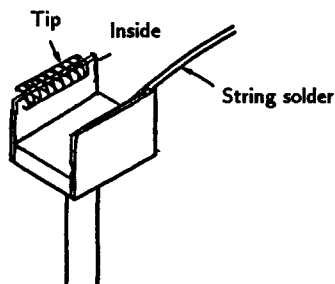
2-8-5. TWO-DIRECTIONAL FLAT PACKAGE IC

MOUNT CONDITION

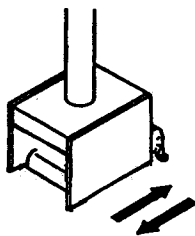


REMOVAL

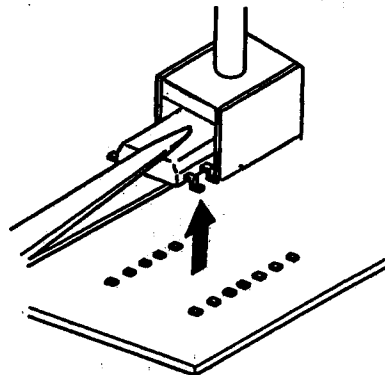
- 1) Apply some solder on the inside and the tip of the iron tip jig.



- 2) Place the iron tip jig over the IC, and move the jig to and fro as shown in the figure.

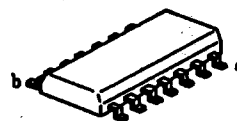


- 3) When the solder melts, lift the IC with a pair of tweezers and remove.

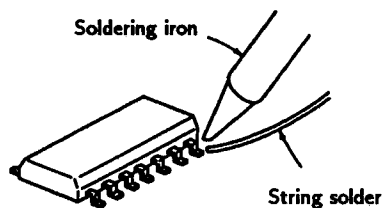


INSTALLATION

- 1) Place the two-directional flat package IC at the appointed position, solder pins a and b on the diagonal, and fasten it.

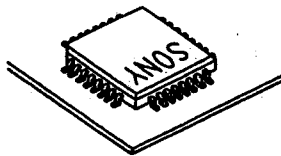
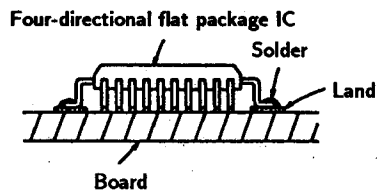


- 2) Solder the remaining pins with the soldering iron.



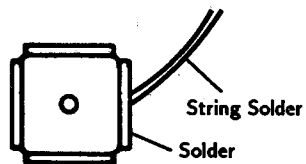
2-8-6. FOUR-DIRECTIONAL FLAT PACKAGE IC

MOUNT CONDITION

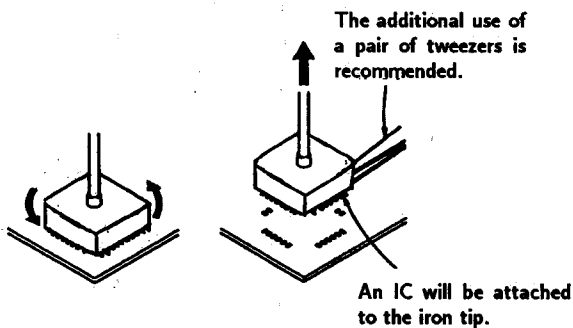


REMOVAL

- 1) Apply solder on the tip of the iron tip jig.



- 2) Place the iron tip jig over the IC, wait about two to three seconds, rotate the iron slightly and lift it up.



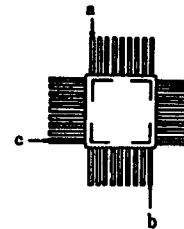
Note: For flat ICs of above 52P, the IC may not be completely attracted when the iron tip jig is lifted up. In these cases, use a pair of tweezers to remove.

INSTALLATION

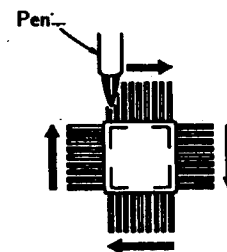
- 1) Place the four-directional flat package IC at the appointed position.



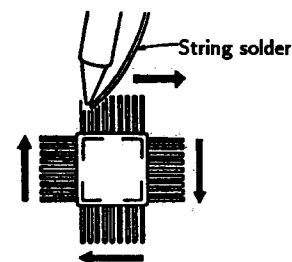
- 2) Apply a slight amount of solder on the iron tip, and solder the three sections in the order of a → b → c, and fix.



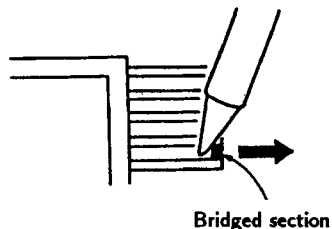
- 3) Apply a slight amount of flux with a pen on all four directions.



- 4) Apply solder on the iron tip and the string solder, and slide and solder in the directions of the arrows.

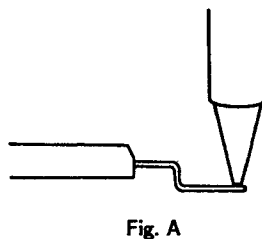


Note: 1) After soldering, if there are bridged sections, correct by sliding the soldering iron in the direction of the arrow.

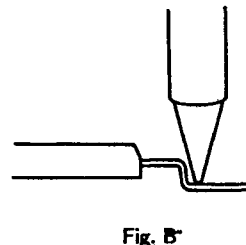


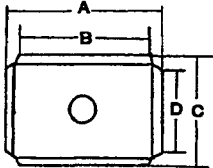
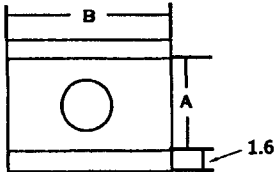
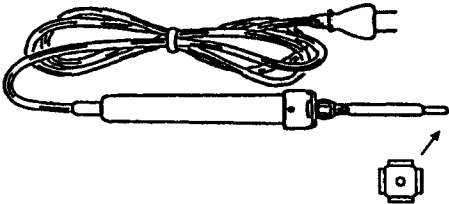
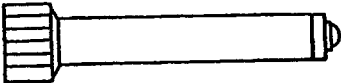
If the bridges cannot be corrected using the above method, apply some flux with a pen and try again.

2) Soldering can be carried out more easily by sliding the iron tip near the tip of the IC leg. (Fig. A)



Be careful not to slide the bent sections of the leg as shown in Fig. B as soldering bridges will be formed.



Exterior	Description	Part No.	Measure (mm)			
			A	B	C	D
	jig for removing 4-sided flat package IC	3-702-554-01	12.5	9.5	12.5	9.5
" 11		15.5	12.5	15.5	12.5	
" 21		16.3	13.3	16.3	13.3	
" 31		17.0	14.0	17.0	14.0	
" 41		23.0	20.0	17.0	14.0	
" 51		20.0	17.0	20.0	17.0	
	jig for removing 2-sided flat package IC	3-702-555-01	6.0	5.0		
" 11		6.0	10.0			
" 21		7.0	12.5			
" 31		9.0	15.2			
" 41		9.0	18.0			
	soldering iron	3-702-552-01	55W 60g length 210mm			
	soldering holder	3-702-553-01				

SECTION 3

SET-UP ADJUSTMENTS

- The following adjustments should be made when a complete realignment is required or a new picture tube is installed.
- These adjustments should be performed with rated power supply voltage unless otherwise noted.

Controls and switch should be set as follows unless otherwise noted :

PICTURE control RESET
BRIGHTNESS control center

Preparations :

- In order to reduce the influence of geomagnetism on the set's picture tube face it east or west.
- Switch on the set's power and degauss with the degausser.

3-1. BEAM LANDING

1. Input the white signal with the pattern generator.
Contrast } normal
Brightness }
2. Set the pattern generator raster signal to green.
3. Move the deflection yoke to the rear and adjust with the purity control so that the green is at the center and the blue and the red take up equally sized areas on each side.
(See Figures 3-1 through 3-3.)
4. Move the deflection yoke forward and adjust so that entire screen is green. (See Figure 3-1.)
5. Switch the raster signal to blue, then to red and verify the condition.
6. When the position of the deflection yoke has been decided, fasten the deflection yoke with the screws.
7. If the beam does not land correctly in all the corners, use a magnet to adjust it.
(See Figure 3-4.)

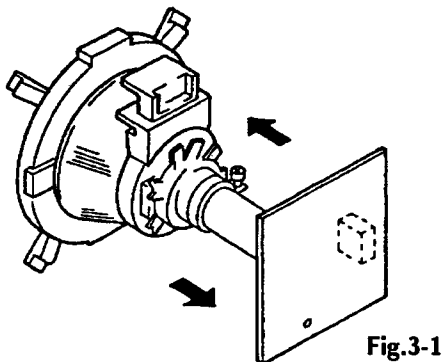


Fig.3-1

Perform the adjustments in order as follows :

1. Beam Landing
2. Convergence
3. Focus
4. White Balance

Note : Test Equipment Required.

1. Color-bar/Pattern Generator
2. Degausser
3. Oscilloscope

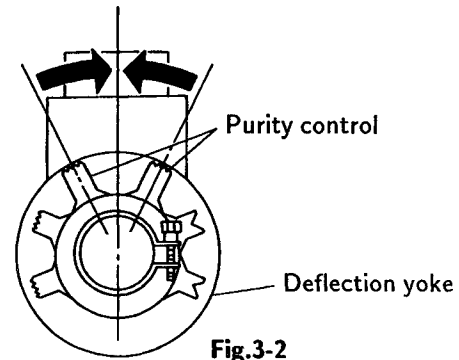


Fig.3-2

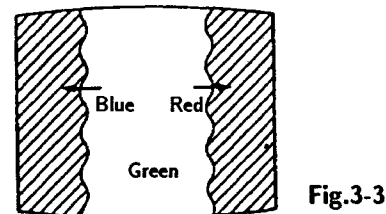


Fig.3-3

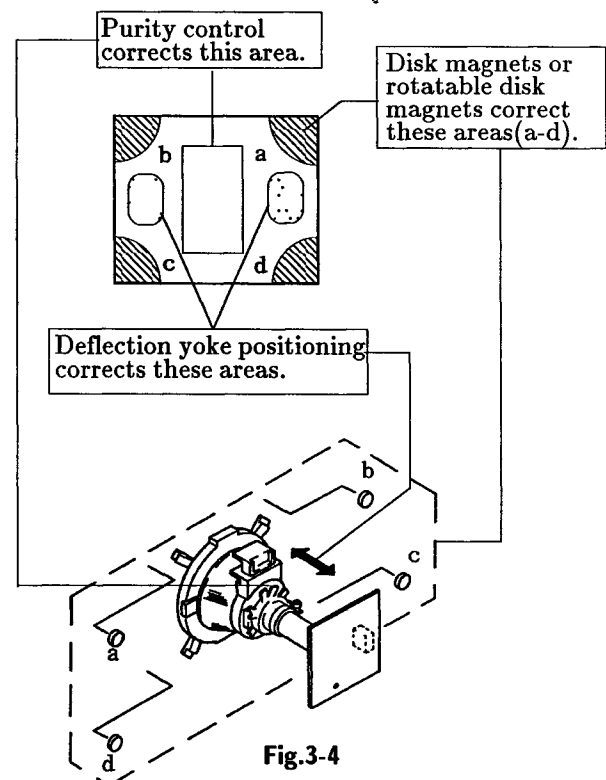


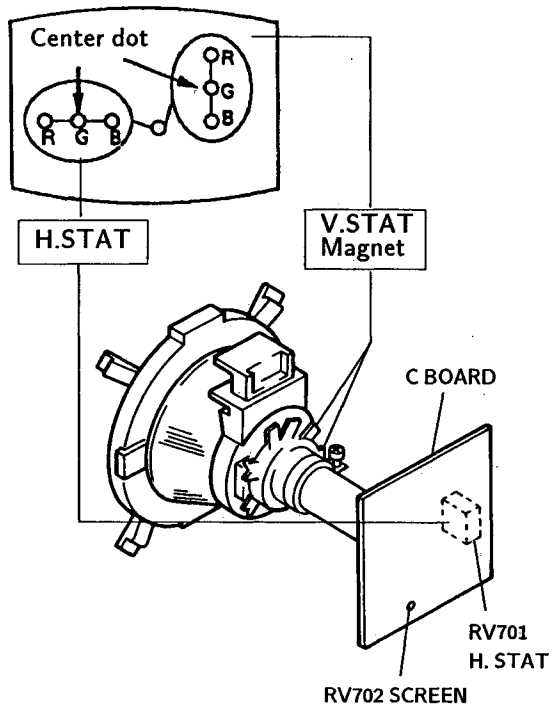
Fig.3-4

3-2. CONVERGENCE

Preparation :

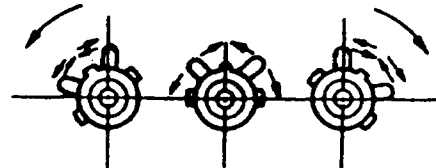
- Before starting this adjustment, adjust the focus, horizontal size, and vertical size.
- Minimize the brightness setting.
- Provide dot pattern.

(1) Horizontal and Vertical Static Convergence

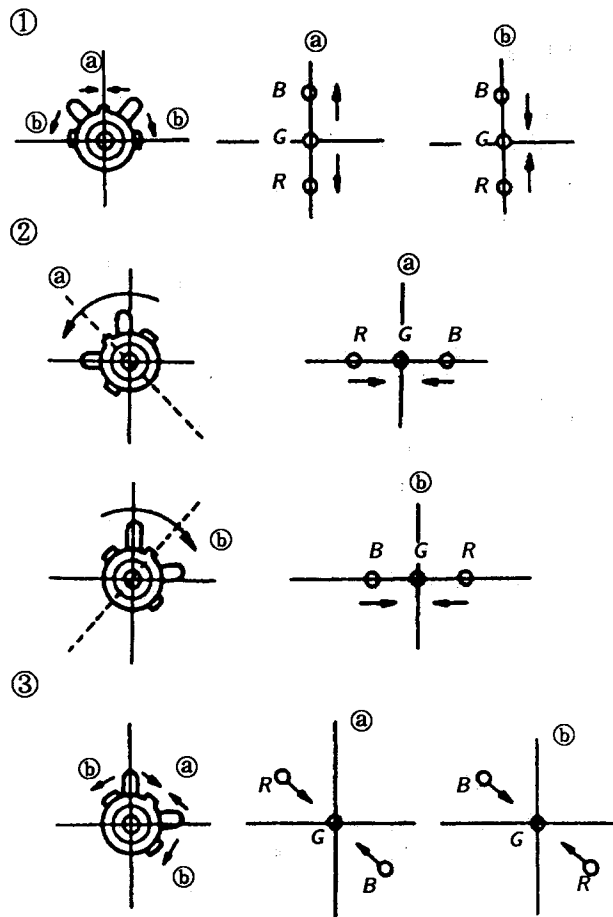


1. (Moving horizontally), adjust the H.STAT control so that the red, green, and blue points are on top of each other at the center of the screen.
2. (Moving vertically), adjust the V.STAT magnet so that the red, green, and blue points are on top of each other at the center of the screen.
3. If the H.STAT variable resistor cannot bring the red, green, and blue points together at the center of the screen, adjust the horizontal convergence with the H.STAT variable resistor and the V. STAT magnet in the manner given below.
(In this case, the H.STAT variable resistor and the V. STAT magnet influence each other)

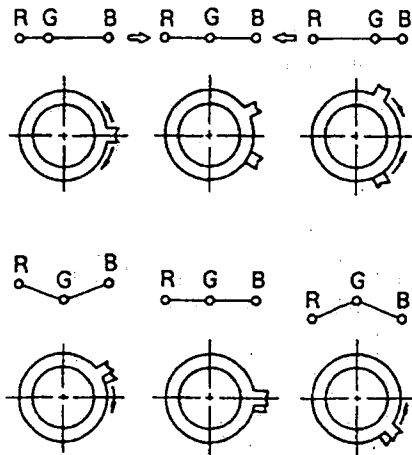
- Tilt the V.STAT magnet and adjust the static convergence by opening or closing the V.STAT magnet.



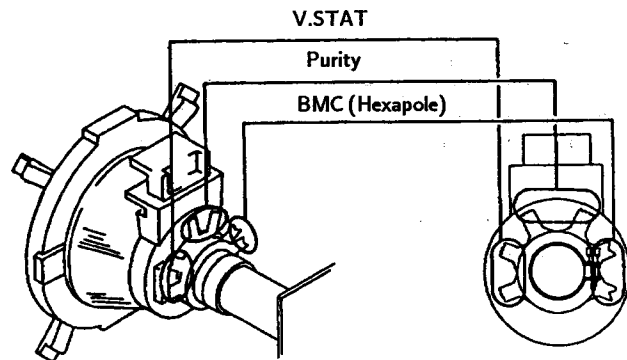
4. If the V.STAT magnet is moved in the direction of the ① and ② arrows, the red, green, and blue points move as shown below.



• Operation of BMC (Hexapole) Magnet



- The respective dot positions resulting from moving each magnet interact, so be sure to perform adjustment while tracking.
Use the H.STAT VR to adjust the red, green, and blue dots so they coincide at the center of screen (by moving the dots in the horizontal direction).



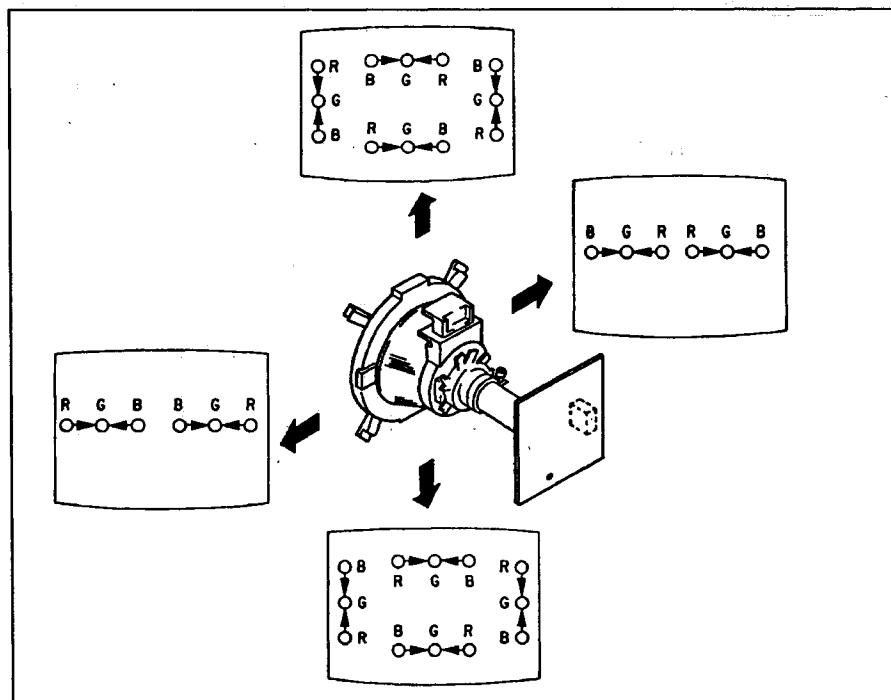
• Y separation axis correction magnet adjustment

1. Receive the cross-hatch signal, and adjust [PIX] to "MIN" and [BRT] to "standard".
2. Adjust the deflection yoke to the upright condition when it hits the CRT.
3. Adjust so that the Y separation axis correction magnet on the neck assembly is symmetrical at the top and bottom (open state).
4. Return the deflection yoke to its original position.

(2) Dynamic Convergence Adjustment

Preparations :

- Before starting this adjustment, adjust the horizontal static convergence and the vertical static convergence.
1. Slightly loosen the deflection yoke screws.
 2. Remove the deflection yoke spacer.
 3. Move the deflection yoke as shown in the figure below and optimize the convergence.
 4. Tighten the deflection yoke screws.
 5. Install the deflection yoke spacer.

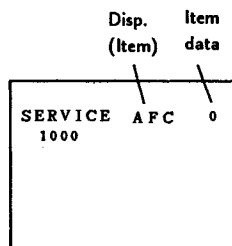


(3) Dynamic Convergence Circuit Adjustment (32 inch only)

SERVICE MODE PROCEDURE

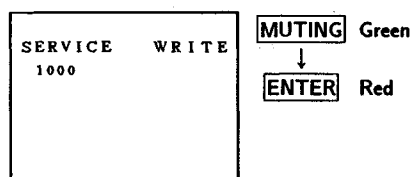
- Standby mode.(Power off)
- DISPLAY** → **5** → **VOL (+)** → **POWER** on the Remote Commander. (Press each button within a second.)

SERVICE ADJUSTMENT MODE IN

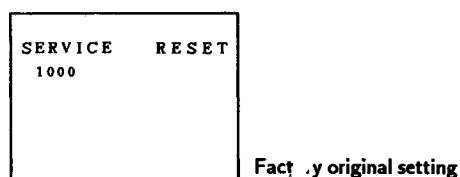


- The CRT displays the item Being adjusted.
- Press **1** or **4** on the Remote Commander to select the item.
- Press **3** or **6** on the Remote Commander to change the data.
- Press **MUTING** then **ENTER** to write into memory.

SERVICE ADJUSTMENT MODE MEMORY



- Press **8** then **ENTER** on the Remote Commander to initialize.



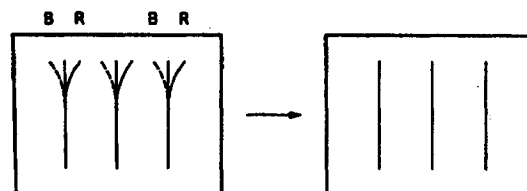
- Turn set off and on to exit.

- Set to Service Mode.
- Input a cross-hatch signal.
- Press **1** and **4** select an item of adjustments.
- Adjust **3** and **6** to the best picture.

No.	Disp.	Item	Ave.Data
39	UYBO	Upper Y-Bow	31
40	LYBO	Lower Y-Bow	25
41	HAMP	H. Amp	33
42	HTIL	H. Tilt	33
43	UCBO	Upper C-Bow	38
44	UTIL	Upper Tilt	40
45	LCBO	Lower C-Bow	41
46	LTIL	Lower Tilt	46
47	DCSH	DC Shift	37

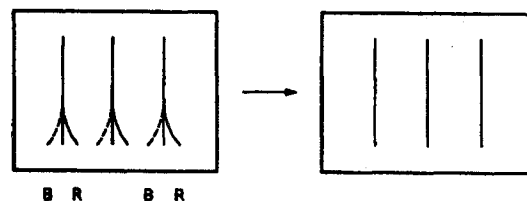
U. YBOW

Select UYBO with **1** and **4**



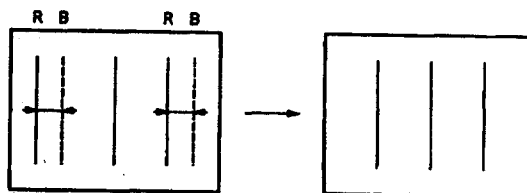
L. YBOW

Select LYBO with **1** and **4**



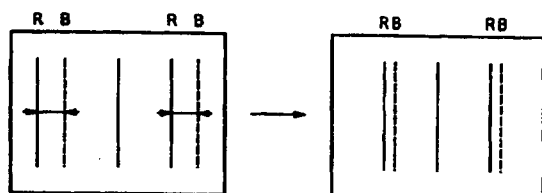
H. AMP

Select HAMP with **1** and **4**



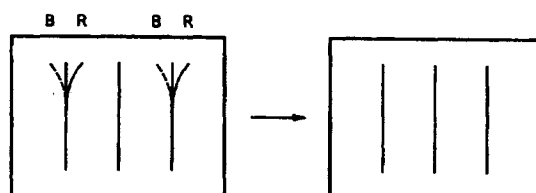
H. TILT

Select HTILT with **1** and **4**



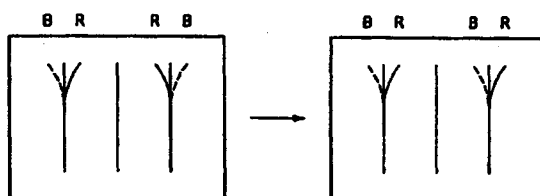
U. CBOW

Select UCBO with **1** and **4**



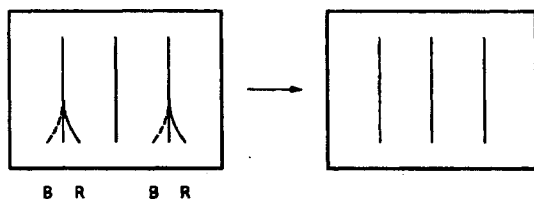
U. TILT

Select UTIL with **1** and **4**



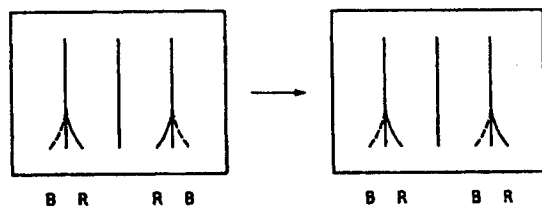
L. CBOW

Select LCBO with **1** and **4**

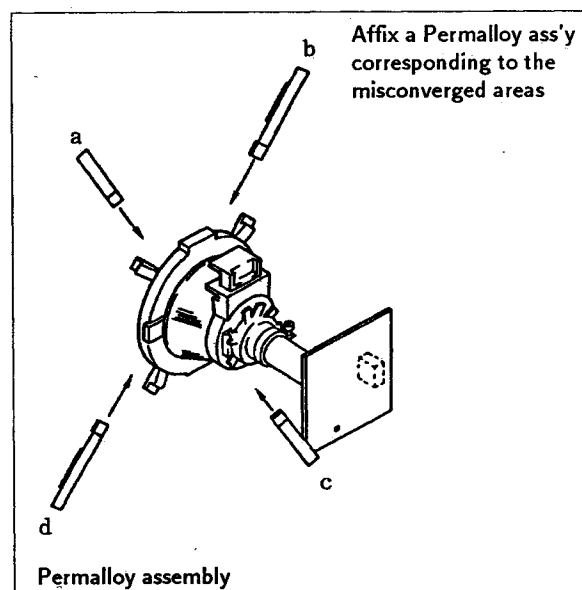
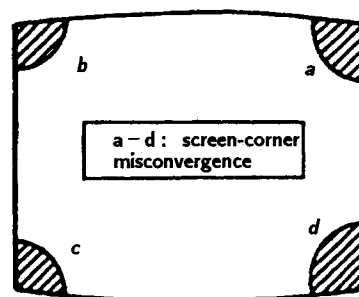


L. TILT

Select L. TIL with **1** and **4**

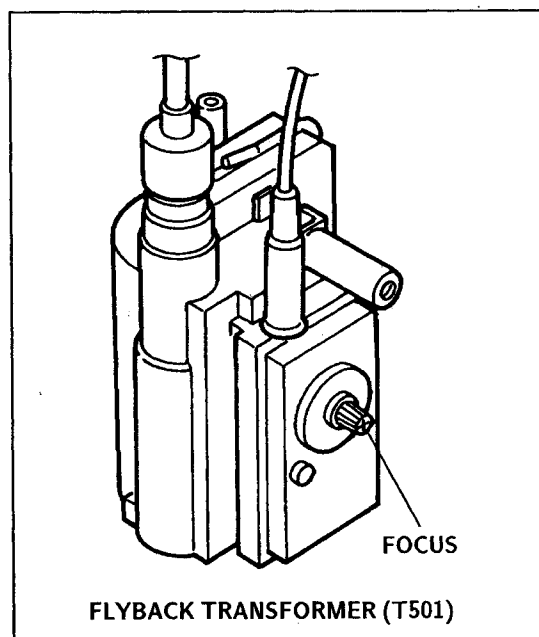


(4) Screen-corner Convergence



3-3. FOCUS ADJUSTMENT

Adjust FOCUS control on the flyback transformer for a best focus.



3-4. G2 (SCREEN) AND WHITE BALANCE ADJUSTMENTS

1. G 2 (SCREEN) ADJUSTMENT(RV 702)

1. Set the PICTURE and BRIGHTNESS to normal.
2. Confirm G 1 voltage is within 30.0 ± 5 V.
3. Apply DC voltage of 180 V to the cathodes of R,G and B from DC stabilized power source.
4. While watching the picture, adjust the G2 control (RV 702) to the just the retrace line disappears.

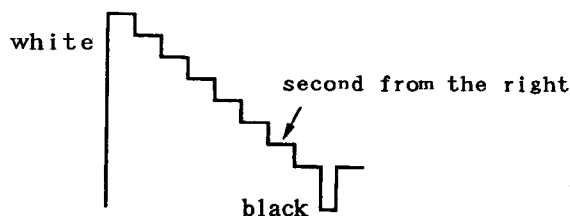
2. WHITE BALANCE ADJUSTMENTS

No.	Disp.	Item	Ave. Data
14	GAMP	Green Amp	20
15	BAMP	Blue Amp	17
16	GCUT	Green Cut-off	7
17	BCUT	Blue Cut-off	8
22	SBRT	Sub Bright	35

1. Input an entire white signal.
2. Set to service adjustment mode.
3. Set the PICTURE and BRIGHT to minimum.
4. Adjust with SBRT if necessary.
5. Select G CUT and B CUT with **[1]** and **[4]**.
6. Adjust with **[3]** and **[6]** for the best white balance.
7. Set the PICTURE and BRIGHT to maximum.
8. Select GAMP and BAMP with **[1]** and **[4]**.
9. Adjust with **[3]** and **[6]** for the best white balance.
10. Write into the memory by pressing **[MUTING]** then **[ENTER]**.

3. SUB BRIGHT ADJUSTMENT

1. Set to service mode.
2. Input a staircase signal of black and white from the pattern generator.
3. BRIGHTNESS ... RESET
PICTURE minimum
4. Select SBRT with **[1]** and **[4]** , and adjust SUB BRIGHT level with **[3]** and **[6]** so that the stripe second from the right is dimly lit.



SECTION 4

SAFETY RELATED ADJUSTMENTS

☒ R511 CONFIRMATION METHOD (HOLD-DOWN CONFIRMATION) AND READJUSTMENTS

The following adjustments should always be performed when replacing the following components (marked with ☒ on the schematic diagram).
PM501, R511, R632, R645, R650

①

1. Preparation before confirmation

- 1) Remove R635 on the D board and connect a variable resistor (RV1: about $4.7k\Omega$ - $10k\Omega$) between pin ① of IC601 and B+ line.
- 2) Supply $130 \pm 2.0V$ AC to with variable auto-transformer.

2. Hold-down operation confirmation

- 1) Turn the POWER switch ON, and receive entirely white signals and adjust ABL current to $1760 \pm 50\mu A$ with PICTURE and BRIGHT etc controls.
- 2) Increase B+ line voltage gradually by adjusting the resistor of RV1. Confirm that the minimum voltage is less than $142.5V$ DC (27 inch) $140.0V$ DC (32 inch) whereby the raster disappears during operation of hold-down circuit.

NOTE: When the hold-down circuit starts operating, switch OFF the POWER of the set immediately.

- 3) Turn the POWER switch ON, and receive dot signals and adjust ABL current to $160 \pm 50\mu A$ with PICTURE and BRIGHT etc controls.
- 4) Increase B+ line voltage gradually by adjusting the resistor of RV1. Confirm that the minimum voltage is less than $143.5V$ DC whereby the raster disappears during operation of hold-down circuit.

NOTE: When the hold-down circuit starts operating, switch OFF the POWER of the set immediately.

3. Hold-down readjustment

When step 2 is not satisfied, readjustment should be performed by altering the resistance value of R511 (a component marked with ☒).

☒ R524 CONFIRMATION METHOD (HOLD-DOWN CONFIRMATION) AND READJUSTMENTS

The following adjustments should always be performed when replacing the following components (marked with ☒ on the schematic diagram).
IC601, PM501, D504, R509, R524, R634, R635, T501

②

1. Preparation before confirmation

- 1) Turn the POWER switch ON, and receive entirely white signals and set the PICTURE and BRIGHT controls to maximum.
- 2) Confirm that voltage of the check terminal of TP-81 (D BOARD) is more than $114.0V$ DC (27 inch) $122.3V$ DC (32inch) when the set is operating normally with $120.0 \pm 2.0V$ AC supply.

2. Hold-down operation confirmation

- 1) Turn the POWER switch ON, and receive entirely white signals and adjust ABL current to $1760 \pm 50\mu A$ with PICTURE and BRIGHT etc controls .
- 2) Apply DC voltage of over $130.0V$ DC gradually to the check terminal of TP-85 (D BOARD) via 1T40 from the DC stabilized power source. Confirm that the minimum voltage is less than $137.5V$ DC (27inch) $143.5V$ DC (32inch) whereby the raster disappears during operation of hold-down circuit.

NOTE: When the hold-down circuit starts operating, switch OFF the POWER of the set immediately.

- 3) Turn the POWER switch ON, and receive dot signals and adjust ABL current to $160 \pm 50\mu A$ with PICTURE and BRIGHT etc controls .
- 4) Apply DC voltage of over $130.0V$ DC gradually to the check terminal of TP-85 (D BOARD) via 1 T40 from the DC stabilized power source. Confirm that the minimum voltage is less than $138.0V$ DC (27inch) $144.1V$ DC (32inch) whereby the raster disappears during operation of hold-down circuit.

NOTE: When the hold-down circuit starts operating, switch OFF the POWER of the set immediately.

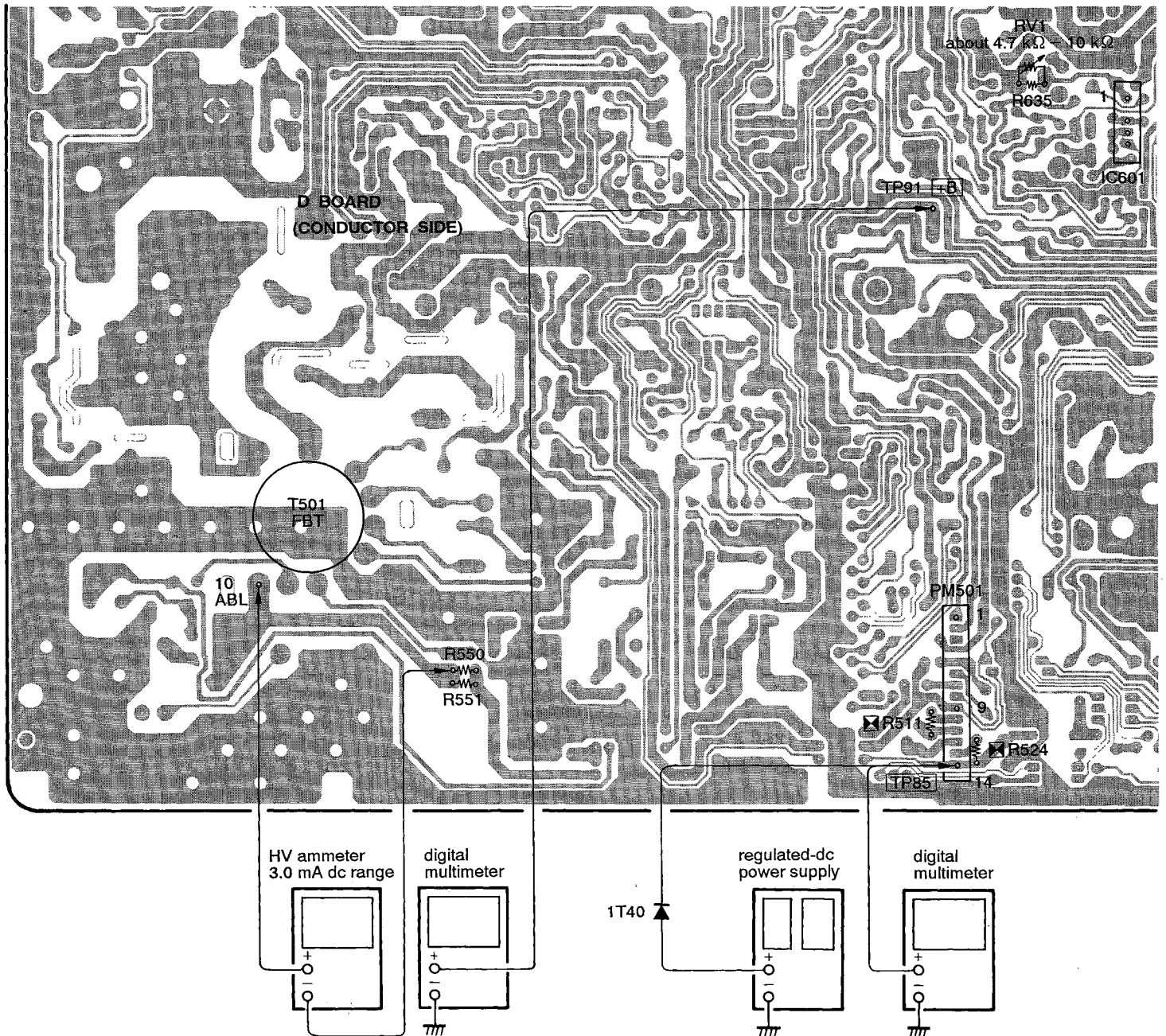
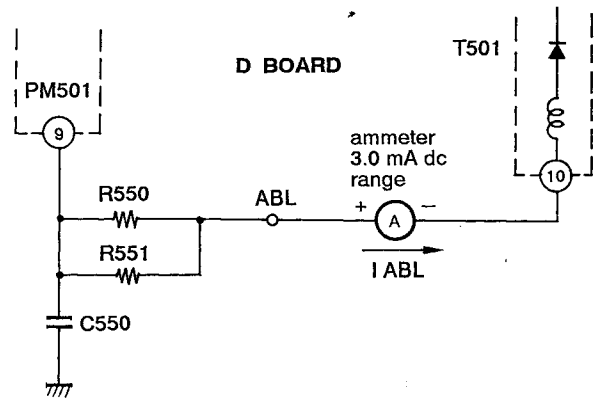
3. Hold-down readjustment

When step 2 is not satisfied, readjustment should be performed by altering the resistance value of R524 (a component marked with ☒).

B+ VOLTAGE CONFIRMATION

The following adjustments should always be performed when replacing IC601 and R635.

- 1) Supply $130 \pm 2.0V$ AC to with variable autotransformer.
- 2) Receive entirely monoscope signal.
- 3) Set the PICTURE control and the BRIGHT controls in to initial reset.
- 4) Confirm the voltage of TP91 is less than 137.0V DC.
- 5) If step 4) is not satisfied, replace IC601 and R635 repeat above steps.



SECTION 5

CIRCUIT ADJUSTMENTS

5-1. ELECTRICAL ADJUSTMENT BY REMOTE COMMANDER

Use of Remote Commander can be performed circuit adjustments about this model.

NOTE : Test Equipment Required.

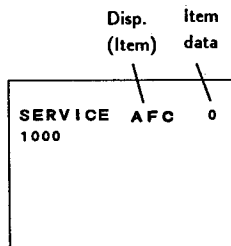
1. Pattern Generator
2. Frequency counter
3. Digital multimeter
4. Audio OSC

1. METHOD OF SETTING THE SERVICE ADJUSTMENT MODE

SERVICE MODE PROCEDURE

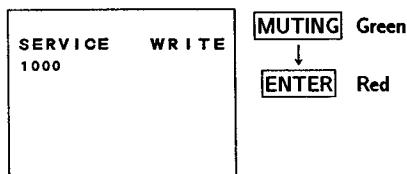
1. Standby mode.(Power off)
2. **DISPLAY** → **5** → **VOL (+)** → **POWER** on the Remote Commander. (Press each button within a second.)

SERVICE ADJUSTMENT MODE IN

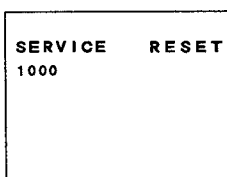


3. The CRT displays the item Being adjusted.
4. Press **1** or **4** on the Remote Commander to select the item.
5. Press **3** or **6** on the Remote Commander to change the data.
6. Press **MUTING** then **ENTER** to write into memory.

SERVICE ADJUSTMENT MODE MEMORY



7. Press **8** then **ENTER** on the Remote Commander to initialize.



Carry out step 7) when adjusting IDs 0 to 4 and when replacing and adjusting IC102.

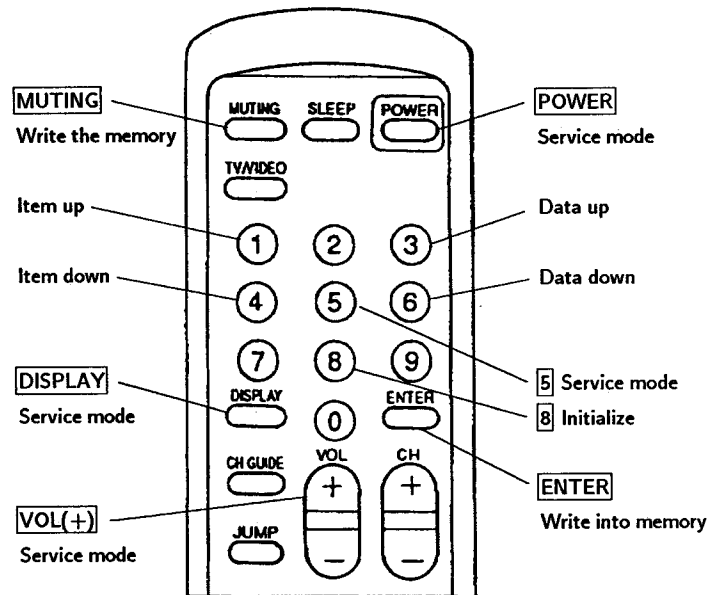
Factory original setting

8. Turn set off and on to exit.

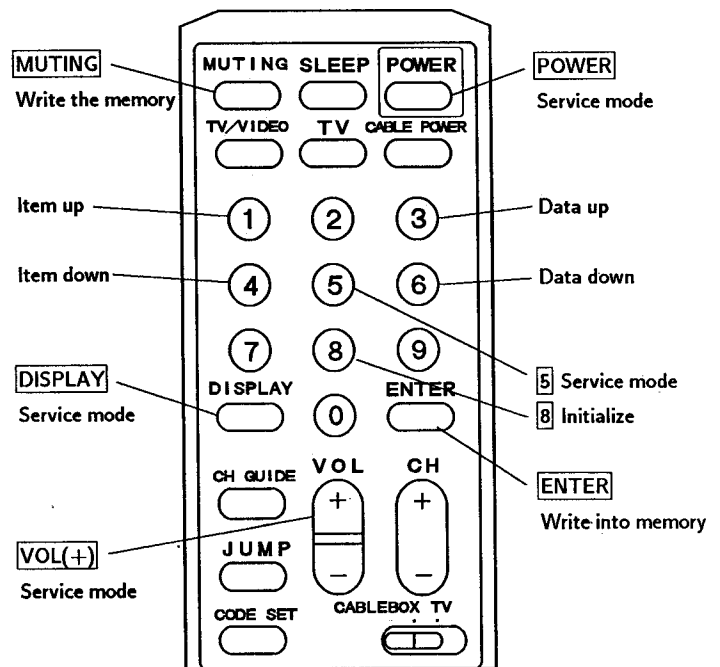
2. MEMORY WRITE CONFIRMATION METHOD

1. After adjustment, pull out the plug from AC outlet, and next place, plug in AC outlet again.
2. Turn the power switch ON and set to Service Mode.
3. Call the adjusted items again, confirm they were adjusted.

3. ADJUST BUTTONS AND INDICATOR



RM-Y116



RM-Y117/RM-Y118

4. AN ITEM OF ADJUSTMENTS

No	Disp.	Item	Data range	Ave. data (27 inch)	Ave. data (32 inch)
1	AFC	AFC Loop Gain	0~3	* 0	* 0
2	HFRE	H. Frequency	0~127	70	70
3	VFRE	V. Frequency	0~31	16	16
4	VPOS	V. Center	0~31	17	17
5	VSIZ	V. Size	0~63	28	12
6	VLIN	V. Linearity	0~15	8	7
7	VSCO	V. Correction	0~15	6	6
8	HPOS	H. Center	0~15	6	5
9	HSIZ	H. Size	0~31	31	27
10	PAMP	Pin Amp	0~31	24	31
11	CPIN	Corner Pin	0~7	3	0
12	PPHA	Pin Phase	0~15	6	4
13	VCOM	V. Compensation	0~7	* 2	* 2
14	GAMP	Green Amp	0~31	20	20
15	BAMP	Blue Amp	0~31	17	17
16	GCUT	Green Cut Off	0~15	7	7
17	BCUT	Blue Cut Off	0~15	8	8
18	CROM	Chroma Trap	0~63	* 28	* 28
19	SPIX	Sub Contrast	0~63	20	20
20	SHUE	Sub Hue	0~63	33	33
21	SCOL	Sub Color	0~63	32	32
22	SBRT	Sub Bright	0~63	35	35
23	RGBP	RGB Picture	0~63	* 10	* 10
24	SHAP	Sharpness	0~15	* 7	* 7
25	VSMO	V Pull in Range	0, 1	* 0	* 0
26	REF	Reference line	0~3	* 2	* 2
27	ROFF	Red Out	0, 1	1	1
28	GOFF	Green Out	0, 1	1	1
29	BOFF	Blue Out	0, 1	1	1
30	ABLM	ABL Mode	0, 1	* 0	* 0
31	NOTC	Notch On/Off	0, 1	* 1	* 1
32	DRGB	OSD intensity	0, 1	* 0	* 0
33	VANG	V. Angle	0~63	0	0
34	DISP	Display Position	0~63	40	40
35	SVOL	Sub Volume	0~15	* 0	* 0
36	SBAL	Sub Balance	0~15	7	7
37	BASS	Sub Bass	0~15	* 8	* 8
38	TRE	Sub Treble	0~15	* 7	* 7
39	UYBO	Upper Y. Bow	0~63	—	31
40	LYBO	Lower Y. Bow	0~63	—	25
41	HAMP	H. Amp	0~63	—	33
42	HTIL	H. Tilt	0~63	—	33
43	UCBO	Upper C. Bow	0~63	—	38
44	UTIL	Upper Tilt	0~63	—	40
45	LCBO	Lower C. Bow	0~63	—	41
46	LTIL	Lower Tilt	0~63	—	46
47	DCSH	DC. Shift	0~63	—	37
48	PHPO	PinP H Position	0~127	76	76
49	PHUE	PinP Hue	0~31	* 0	* 0
50	ID-0	Model ID	0~127	by Model	by Model
51	ID-1	Model ID	0~127	by Model	by Model
52	ID-2	Model ID	0~127	by Model	by Model
	ID-2	Model ID	0~127	by Model	by Model
	ID-2	Model ID	0~127	by Model	by Model
53	ID-3	Model ID	0~127	by Model	by Model
54	ID-4	Model ID	0~127	by Model	by Model

Note : No. from 1 to 54 is to show adjustment order.

SERVICE ID 0 64
1000 1000 000

Please adjust the function values as shown below when IC 102 on M board was replaced.

KV-27TW77/27TW78
KV-32TW77/32TW78

No.	Disp.	Disp.	Data
50	ID-0	1 1 1 1 0 0 0	120
51	ID-1	1 1 1 1 1 1 1	127
52	ID-2	1 0 0 1 0 0 0	72
53	ID-3	1 0 0 0 0 0 0	64
54	ID-4	0 0 1 0 0 0 0	16

* : Set-up value

5-2. M BOARD ADJUSTMENTS

H.FREQUENCY ADJUSTMENT (HFRE)

1. Input a color-bar signal.
2. Set to Service adjustment Mode.
3. Connect a frequency counter to CN131 Pin⑬ (H. DRIVE) connector and ground.
4. Call the item of AFC, set to 3 level (free run).
5. Select HFRE with **[1]** and **[4]**.
6. Adjust with **[3]** and **[6]** for the $15734 \pm 60\text{Hz}$.
7. Call the item of AFC again, adjust the level "0".
8. Write into the memory by pressing **[MUTING]** then **[ENTER]**.

V.FREQUENCY ADJUSTMENT (VFRE)

1. Select video 1 with no connecting the signal.
2. Set to Service adjustment Mode.
3. Connect the frequency counter across connector CN131 Pin⑦ (V. DRIVE) connector and ground.
4. Select VFRE with **[1]** and **[4]**.
5. Adjust with **[3]** and **[6]** for the $55 \pm 0.5\text{Hz}$.
6. Write the memory by pressing **[MUTING]** then **[ENTER]**.

SUB CONTRAST ADJUSTMENT (SPIX)

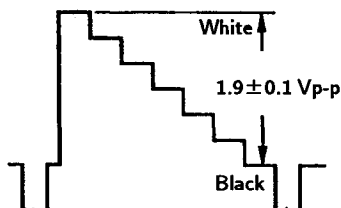
1. Input a color-bar signal.
2. Set to Service adjustment Mode.
3. Set the conditions as follows.

PICTURE MAX
COLOR MIN
BRIGHT CENTER
R OFF ON (1)
G OFF OFF (0)
B OFF OFF (0)

SERVICE	ROFF	1
1000		

1: ON
0: OFF

4. Connect an oscilloscope to CN703 Pin① (R OUT) of C board and ground.
5. Select SPIX with [1] and [4].
6. Adjust with [3] and [6] for the $1.9 \pm 0.1 V_{p-p}$.

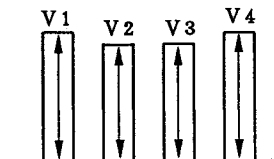


7. Write the memory by pressing [MUTING] then [ENTER].
8. Return the following back to normal after adjustment.

PICTURE MAX
BRIGHT CENTER
COLOR CENTER
R OFF ON
G OFF ON
B OFF ON

SUB HUE, SUB COLOR ADJUSTMENT (SHUE, SCOL)

1. Input a color-bar signal.
2. Set to service adjustment mode.
3. Connect an oscilloscope to CN703 Pin③ (B OUT) of C board.
4. Select SHUE and SCOL with [1] and [4].
5. Adjust with [3] and [6] for the $V_1 = V_4$ (SCOR) and $V_2 = V_3$ (SHUE).



6. Increase the data of [SCOL] by 5 steps.
7. Write into the memory by pressing [MUTING] then [ENTER].

SUB BARANCE ADJUSTMENT (SBAL)

1. Input a stereo signal.
2. Set to service adjustment mode.
3. Select SBAL with [1] and [4].
4. Adjust with [3] and [6] for the best sound balance
5. Write into the memory by pressing [MUTING] then [ENTER].

DISPLAY POSITION ADJUSTMENT (DISP)

1. Input a color-bar signal.
2. Set to service adjustment Mode.
3. Select DISP with [1] and [4].
4. Adjust with [3] and [6] for the bar center.
5. Write the memory by pressing [MUTING] then [ENTER].

SERVICE	AFC	0
1000		

H.CENTER ADJUSTMENT (H POS)

Note: Perform this adjustment after H.FREQUENCY ADJUSTMENT (HFRE) .

1. Input a cross-hatch signal.
2. Set the Service adjustment mode.
3. Select HPOS with **[1]** and **[4]** .
4. Adjust with **[3]** and **[6]** to the best horizontal center.
5. Write into the memory by pressing **[MUTING]** then **[ENTER]** .

H. CENTER (HPOS)



H.SIZE ADJUSTMENT (HSIZ)

1. Input a cross-hatch signal.
2. Set to service adjustment Mode.
3. Select HSIZ with **[1]** and **[4]** .
4. Adjust with **[3]** and **[6]** for best horizontal size.
5. Write into the memory by pressing **[MUTING]** then **[ENTER]** .

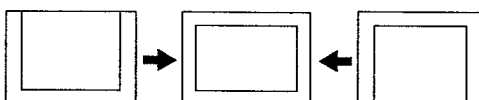
H. SIZE (HSIZ)



V.CENTER ADJUSTMENT (VPOS)

1. Input a cross-hatch signal.
2. Set to service adjustment Mode.
3. Select VPOS with **[1]** and **[4]** .
4. Adjust with **[3]** and **[6]** for the best vertical center.
5. Write into the memory by pressing **[MUTING]** then **[ENTER]** .

V. CENTER (VPOS)



V.SIZE ADJUSTMENT (VSIZ)

1. Input a cross-hatch signal.
2. Set to service adjustment Mode.
3. Select VSIZ with **[1]** and **[4]** .
4. Adjust with **[3]** and **[6]** for the best vertical size.
5. Write into the memory by pressing **[MUTING]** then **[ENTER]** .

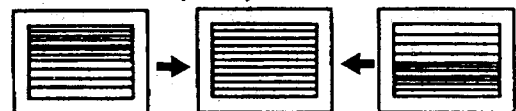
V. SIZE (VSIZ)



V LINEARITY(VLIN), VS CORRECTION(VSCO), PIN AMP(PAMP), CORNER PIN(CPIN), AND PIN PHASE(PPHA) ADJUSTMENTS

1. Input a cross-hatch signal.
2. Set to Service adjustment Mode.
3. Select VLIN, VSCO, PAMP, CPIN, and PPHA with **[1]** and **[4]** .
4. Adjust with **[3]** and **[6]** for the best picture.
5. Write the memory byPressing **[MUTING]** then **[ENTER]** .

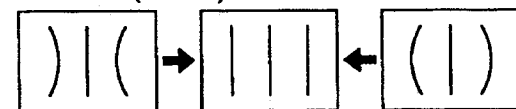
V LINEARITY (VLIN)



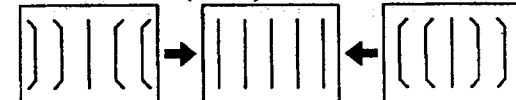
VS CORRECTION (VSCO)



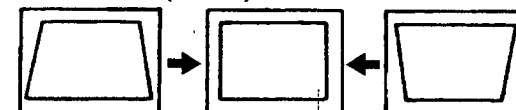
PIN AMP (PAMP)



CORNER PIN (CPIN)

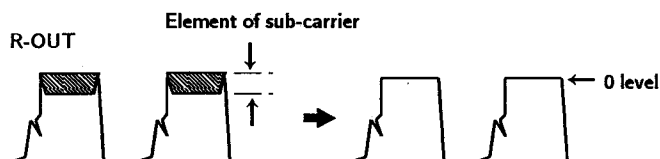


PIN PHASE (PPHA)



CROMA TRAP ADJUSTMENT (CROM)

1. Input a red signal
2. Set to Service adjustment Mode.
3. Connect an oscilloscope CN703 Pin① (R OUT) of C board ground.
4. Select CROM with **[1]** and **[4]**.
5. Adjust with **[3]** and **[6]** for the 0 level.

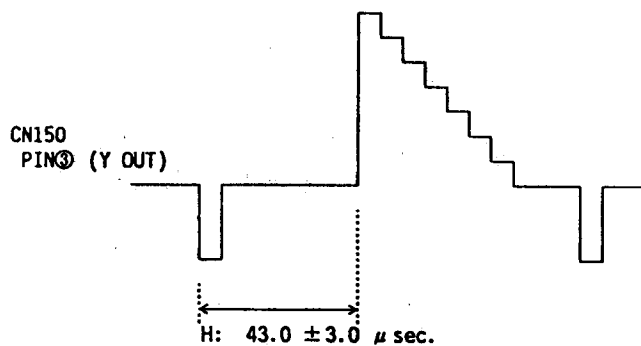


6. Write the memory by pressing **MUTING** then **ENTER**.

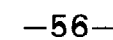
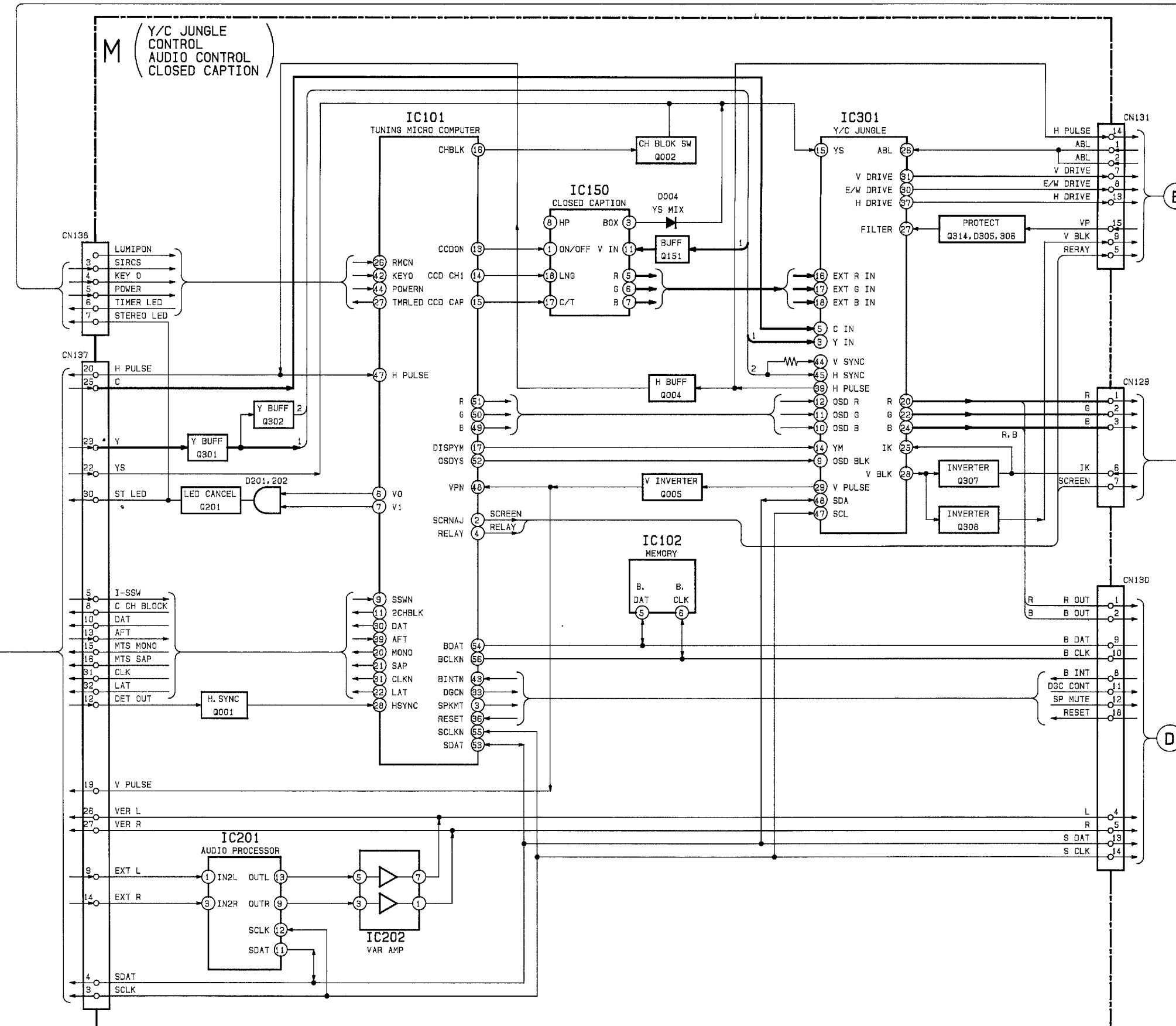
5-3. P BOARD ADJUSTMENTS

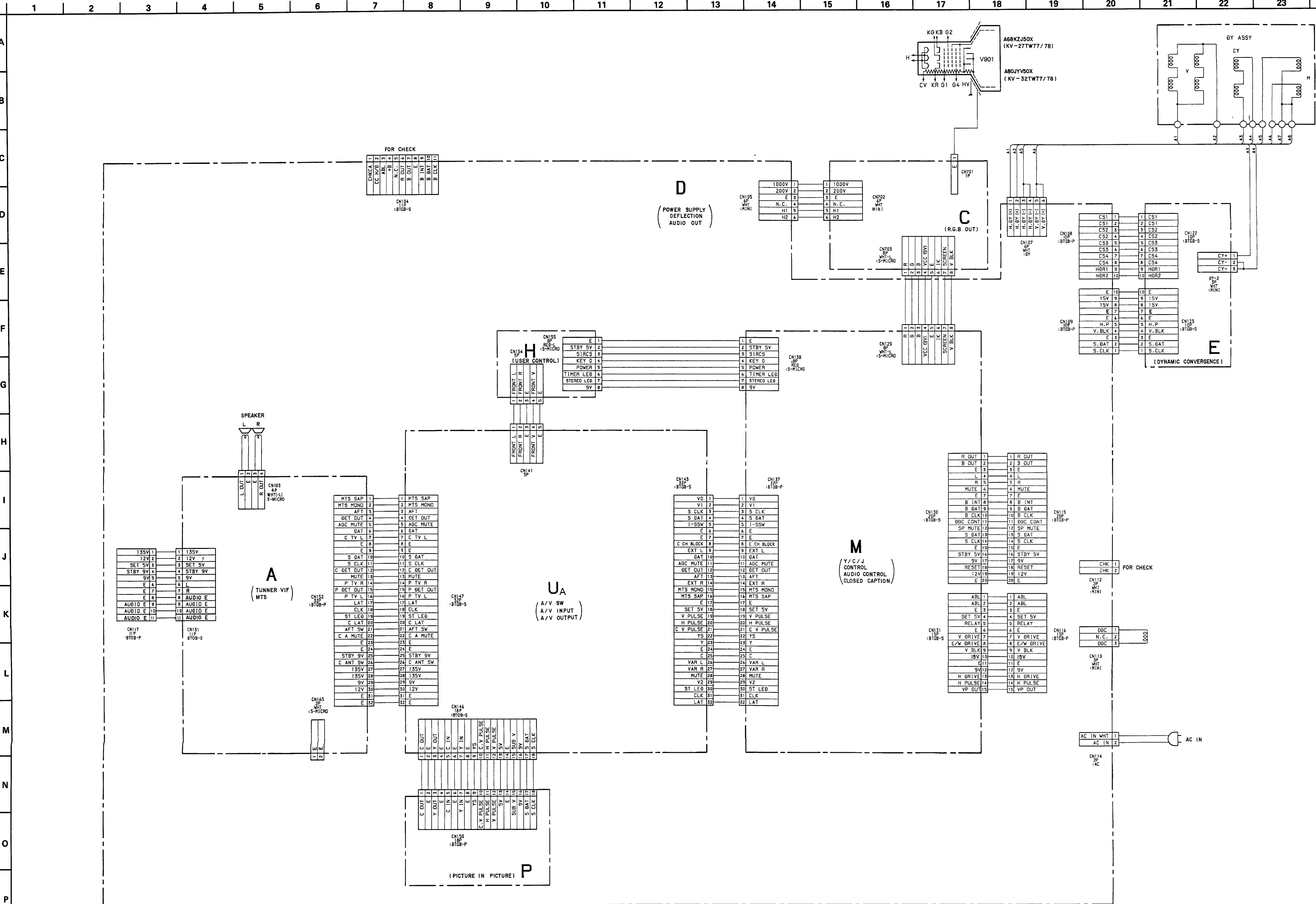
P IN P H. POSITION (PHPO)

1. Input a color-bar signal
2. Set to Service adjustment Mode.
3. Connect an oscilloscope CN150 Pin③ (Y OUT).
4. Select PHPO with **[1]** and **[4]**.
5. Adjust with **[3]** and **[6]** for the $43.0 \pm 3.0 \mu\text{sec}$ (H).

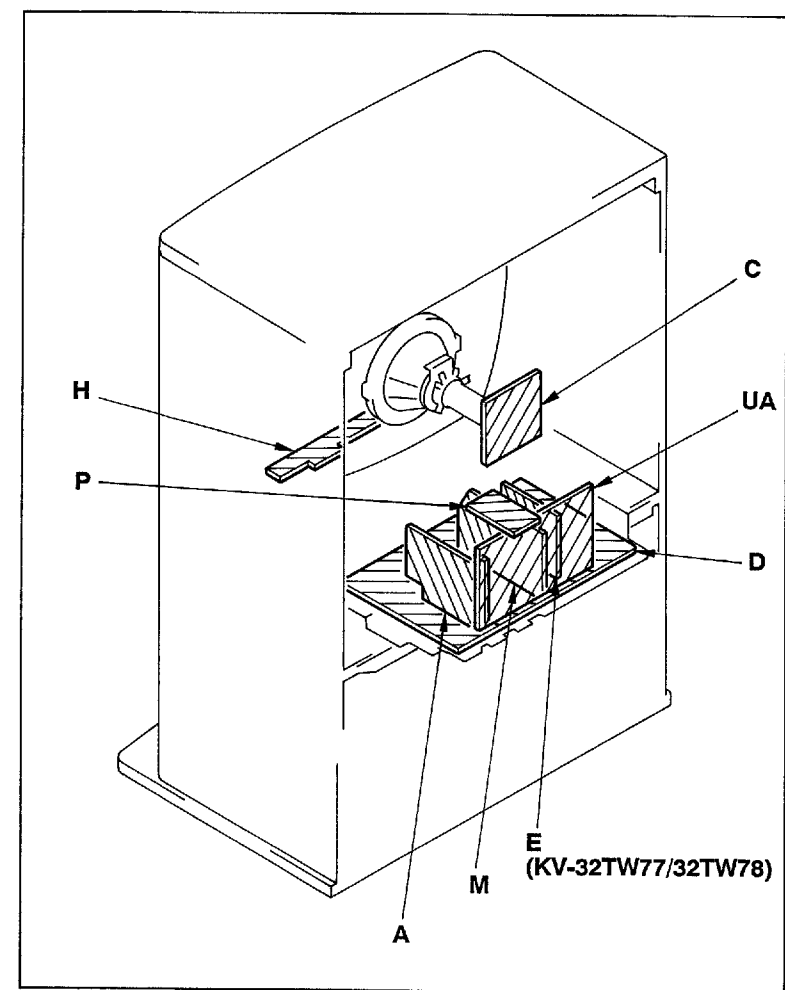


6. Write the memory by pressing **MUTING** then **ENTER**.





6-3. CIRCUIT BOARDS LOCATION



6-4. SCHEMATIC DIAGRAMS AND PRINTED WIRING BOARDS

Note:

- All capacitors are in μF unless otherwise noted. pF : μF
- 50 WV or less are not indicated except for electrolytic and tantalums.
- All resistors are in ohms, $\text{k}\Omega \sim 1000\Omega$, $\text{M}\Omega \sim 1000\text{k}\Omega$.
- Indication of resistance, which does not have one for rating electrical power, is as follows.
- Pitch: 5 mm
- Rating electrical power $\frac{1}{4}\text{W}$
- \square : nonflammable resistor.
- \square : fusible resistor.
- \triangle : internal component.
- \square : panel designation, or adjustment for repair.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- --- : earth-chassis.

Note: The components identified by shading and mark \square are critical for safety. Replace only with part number specified.

Reference information

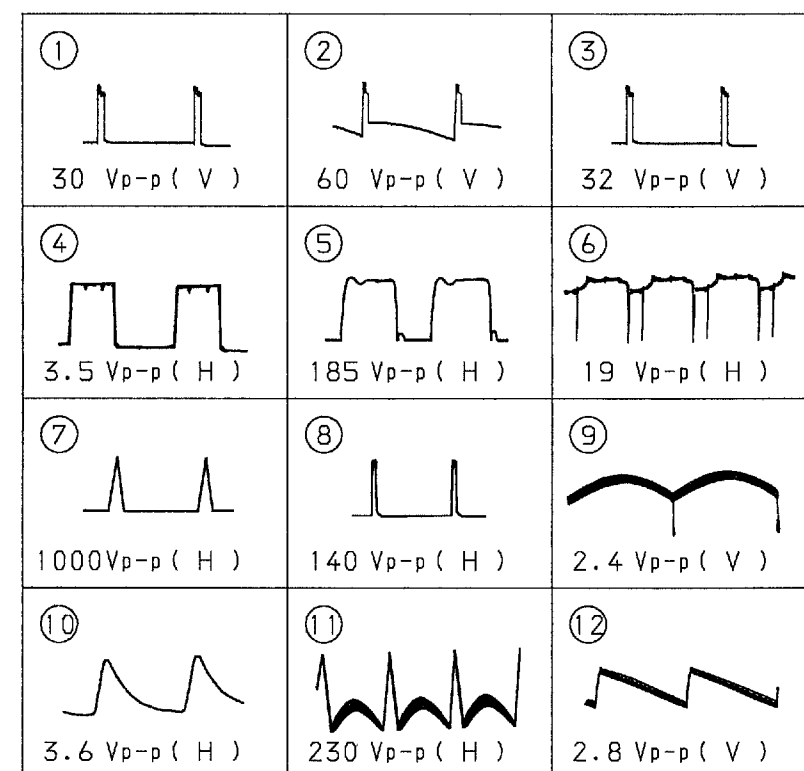
RESISTOR	RC	METAL FILM
	RC	SOLID
	FPFD	NONFLAMMABLE CARBON
	FUSE	NONFLAMMABLE FUSIBLE
	RS	NONFLAMMABLE METAL OXIDE
	RB	NONFLAMMABLE CEMENT
	RW	NONFLAMMABLE WIREWOUND
	---	ADJUSTMENT RESISTOR
COIL	LF-8L	MICRO INDUCTOR
CAPACITOR	TA	TANTALUM
	PS	STYROL
	PP	POLYPROPYLENE
	PT	MYLAR
	MPS	METALIZED POLYESTER
	MPP	METALIZED POLYPROPYLENE
	ALB	BIPOLAR
	ALT	HIGH TEMPERATURE
	ALR	HIGH RIPPLE

- Readings are taken with a color-bar signal input.
- Readings are taken with a 10M Ω digital multimeter.
- Voltage are dc with respect to ground unless otherwise noted.
- Voltage variations may be noted due to normal production tolerances.
- All voltages are in V.
- Circled numbers are waveform references.
- --- : B+ bus.
- --- : signal path. (RF)
- The components identified by \square in this basic schematic diagram have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation. Should replacement be required, replace only with the value originally used.
- When replacing components identified by \square , make the necessary adjustments indicated. If results do not meet the specified value, change the component identified by \square and repeat the adjustment until the specified value is achieved. (Refer to RS11, RS24 adjustment on page 30.)
- When replacing the part in below table, be sure to perform the related adjustment.

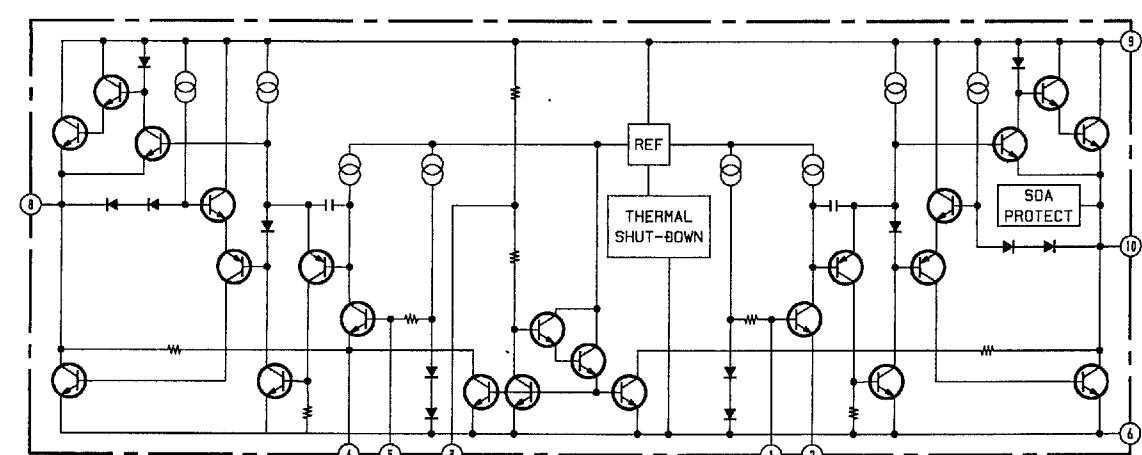
Part replaced (\square)	Adjustment (\square)
PM501, RS11, R832, R845, R850	RS11
IC801, PM501, D504, R508, RS24, R634, R635, T501	RS24

• D BOARD WAVEFORMS

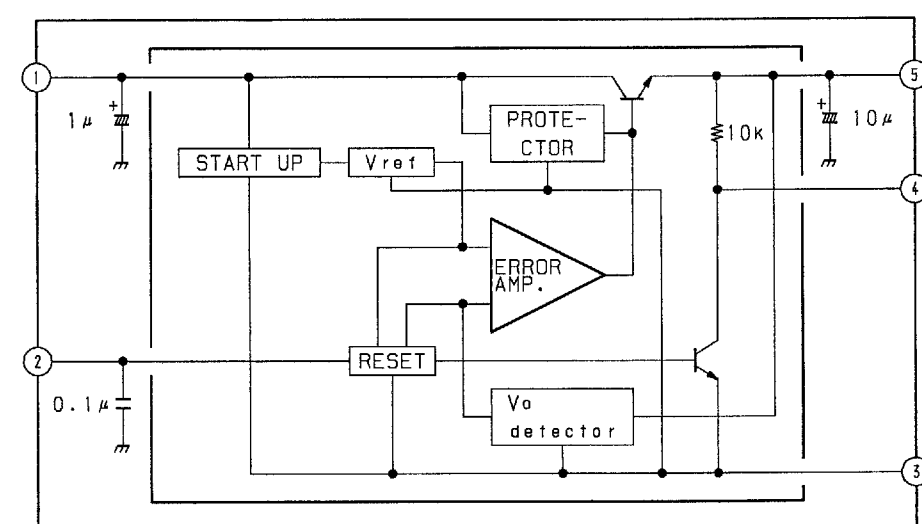
B-SS 4442<U...> B<WAVE1ST>



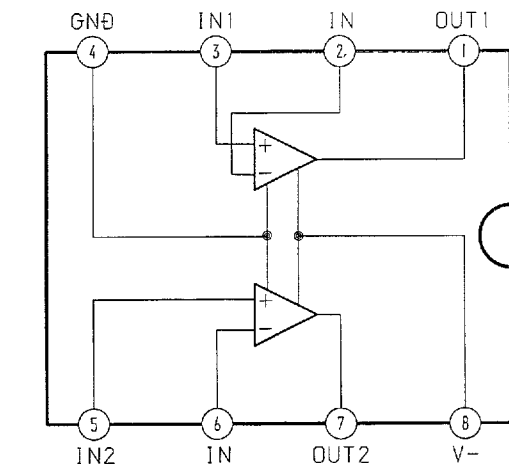
D Board IC2200 TDA2009A



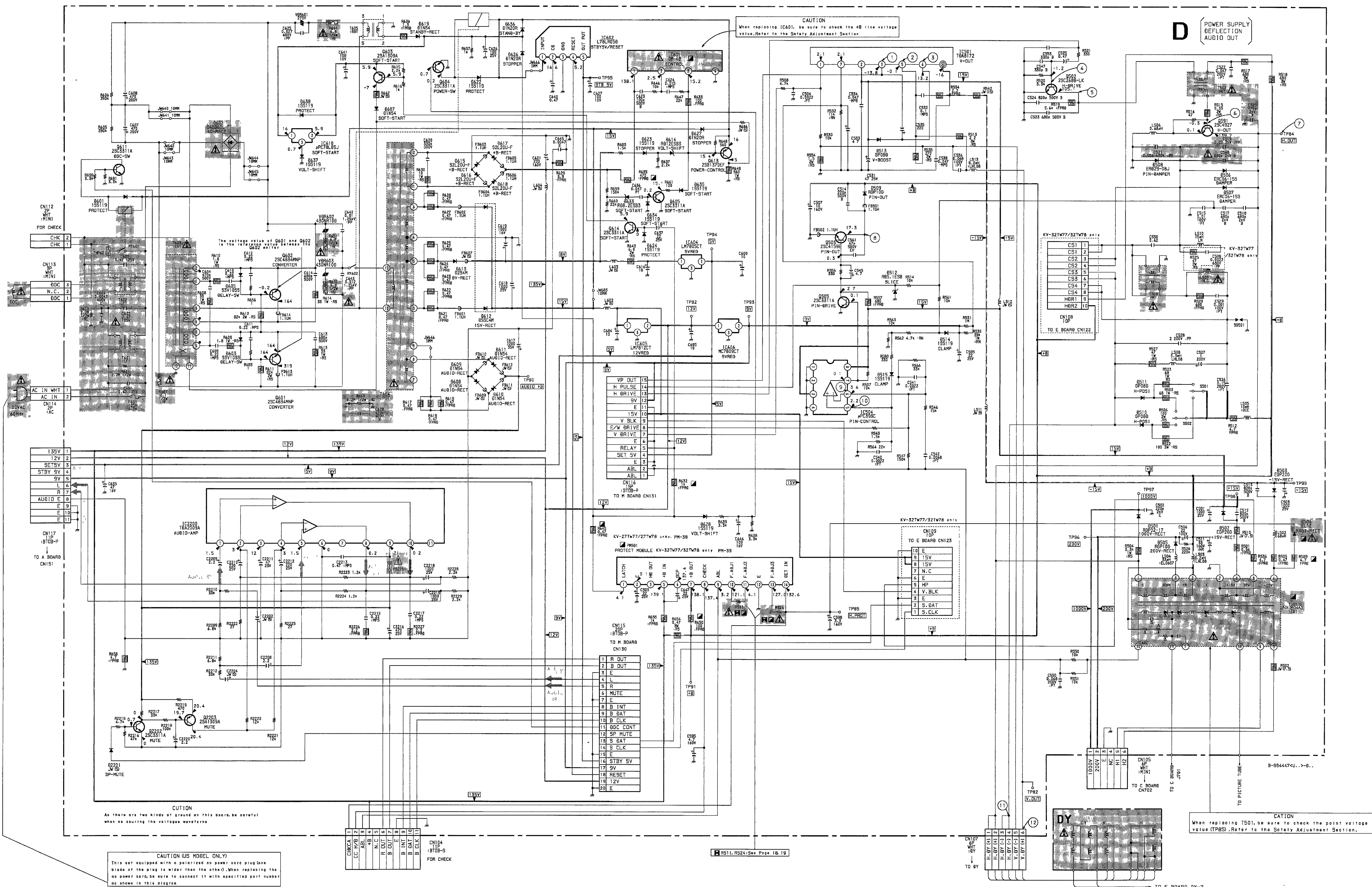
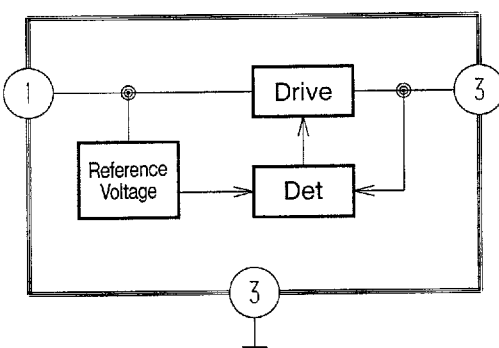
D Board IC602 L78LR05D-MA



D Board IC504 μ PC393C

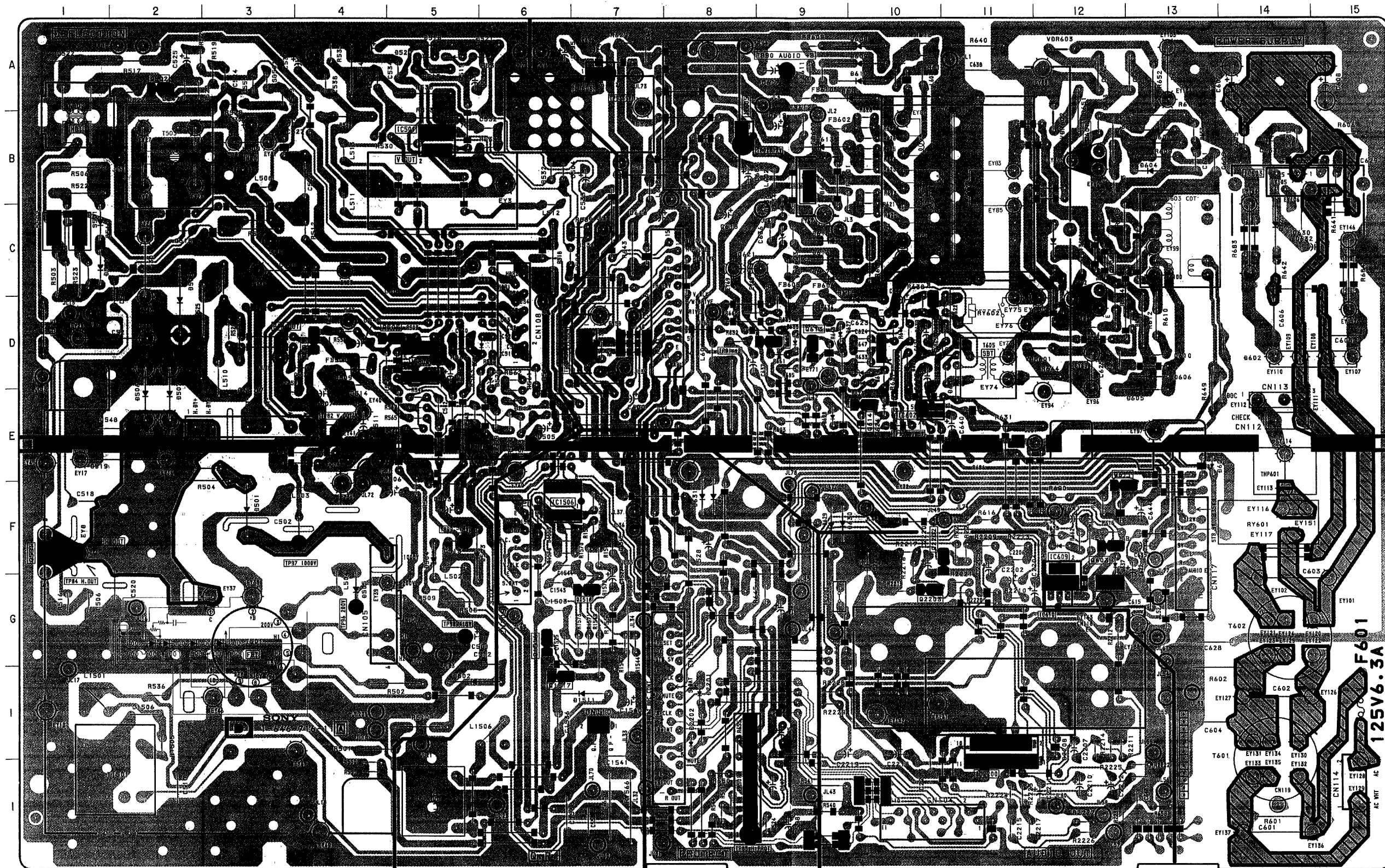


D Board IC610 μ PC78L05J



D POWER SUPPLY
DEFLECTION
AUDIO OUT

- D Board -

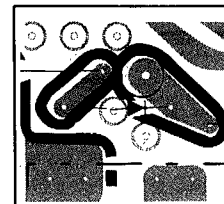


• D BOARD

IC		DIODE	
IC501	B-5	D501	F-3
IC504	D-5	D502	H-5
IC601	D-10	D503	F-5
IC602	E-10	D504	F-5
IC604	D-7	D505	G-4
IC605	B-8	D506	E-2
IC606	A-7	D507	E-2
IC610	G-12	D508	D-2
IC2200	I-11	D509	D-4
		D510	C-1
		D511	C-1
		D512	D-7
		D513	A-5
		D514	E-6
		D515	D-6
		D601	E-13
		D602	D-14
		D603	B-13
		D605	E-13
		D607	F-12
		D608	A-10
		D609	A-10
		D610	A-10
		D611	A-10
		D612	B-9
		D613	B-9
		D614	D-10
		D615	C-9
		D616	C-9
		D617	C-9
		D618	D-10
		D619	D-10
		D622	D-11
		D623	D-10
		D624	E-10
		D625	D-10
		D626	D-9
		D627	D-9
		D628	E-9
		D629	F-9
		D630	F-9
		D631	F-8
		D632	F-8
		D633	C-9
		D634	C-9
		D635	D-9
		D636	D-11
		D637	F-12
		D638	F-12

TRANSISTOR

Q502	A-2
Q503	D-4
Q505	D-5
Q591	F-1
Q601	B-12
Q602	C-12
Q603	F-12
Q604	D-10
Q605	D-9
Q611	F-12
Q613	D-9
Q614	E-10
Q2202	F-10
Q2203	G-10

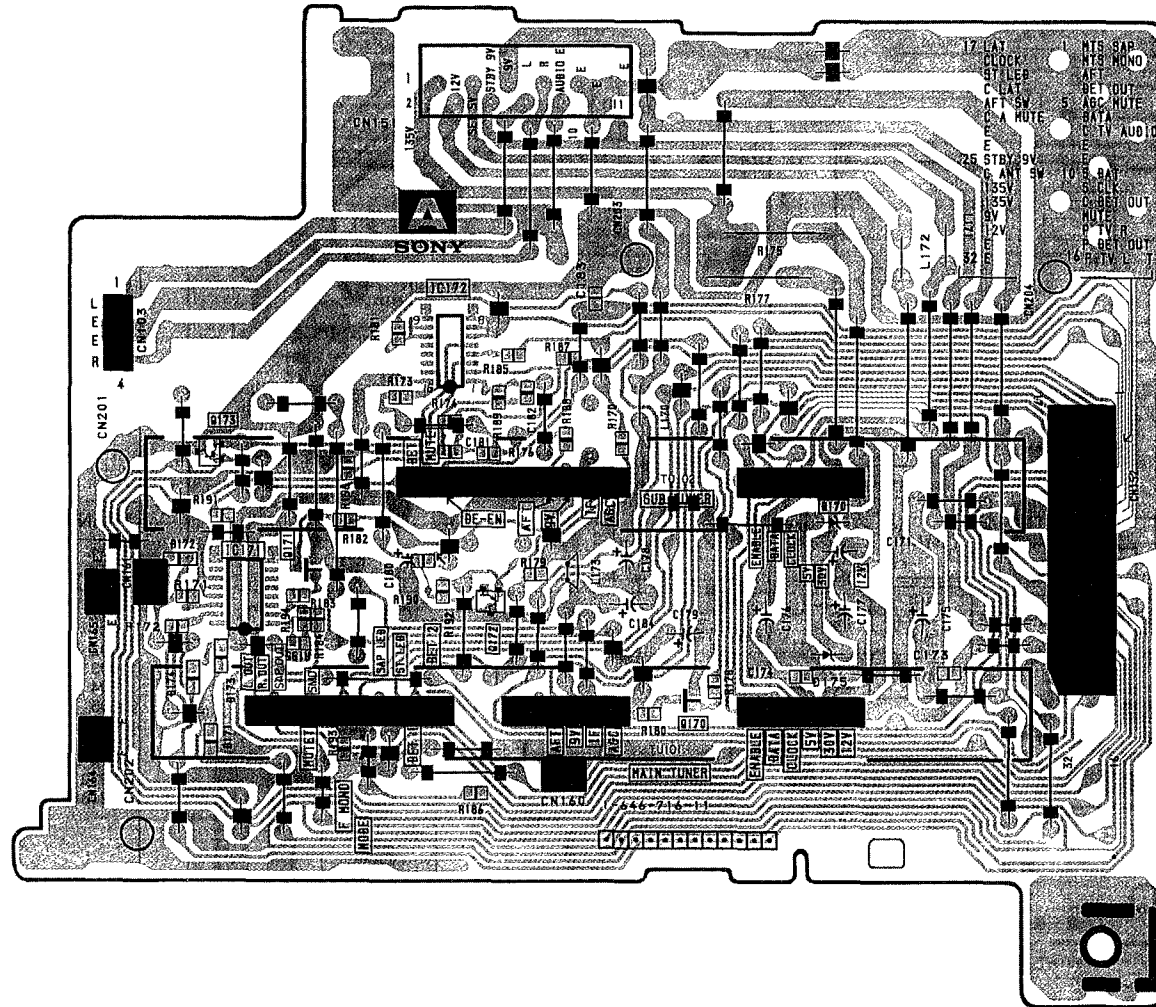
**NOTE:**

The circuit indicated as left contains high voltage of over 600 Vp-p. Care must be paid to prevent an electric shock in inspection or repairing.

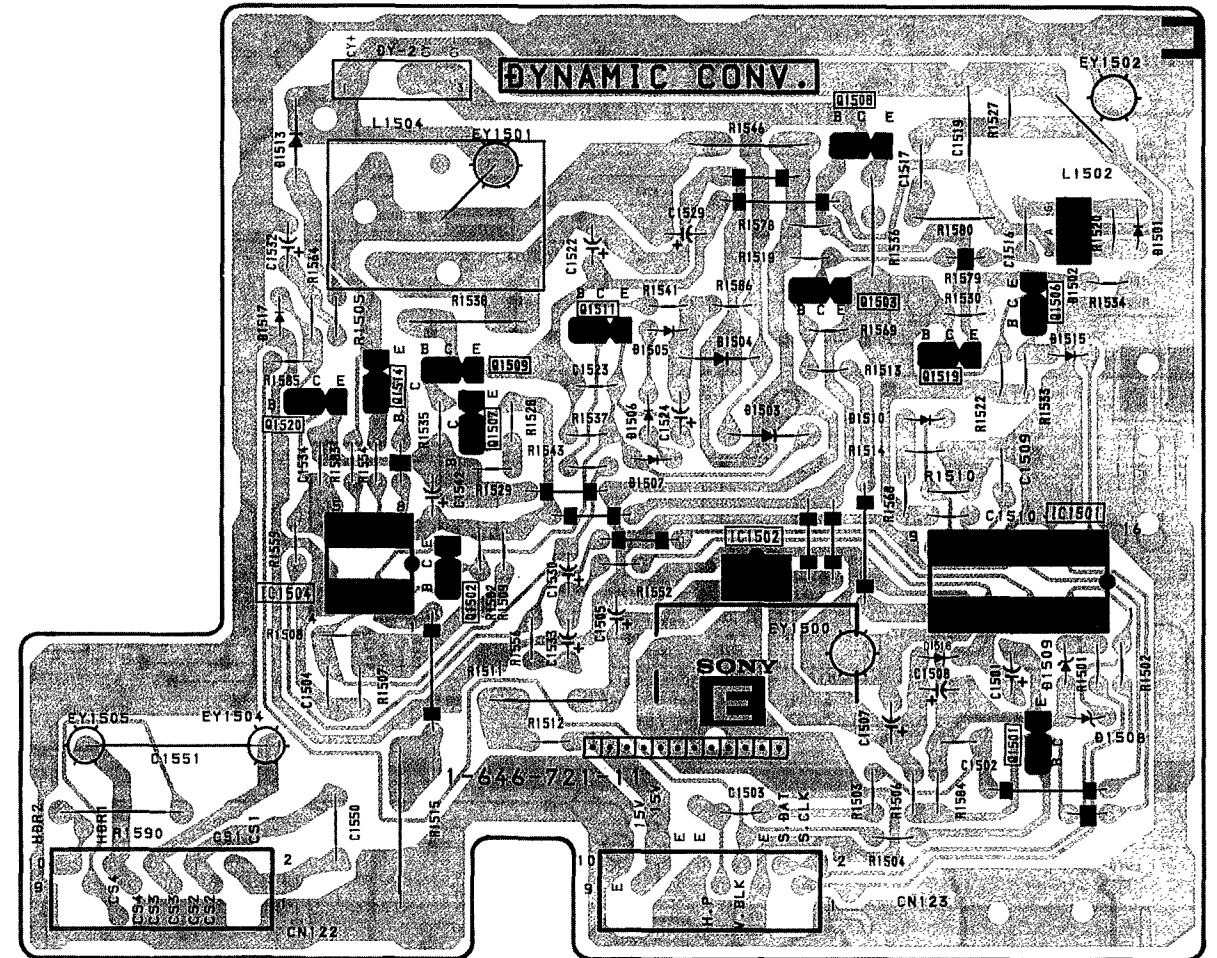
A [TUNER VIF, MTS] **H** [USER CONTROL]

E [DYNAMIC CONVERGENCE]

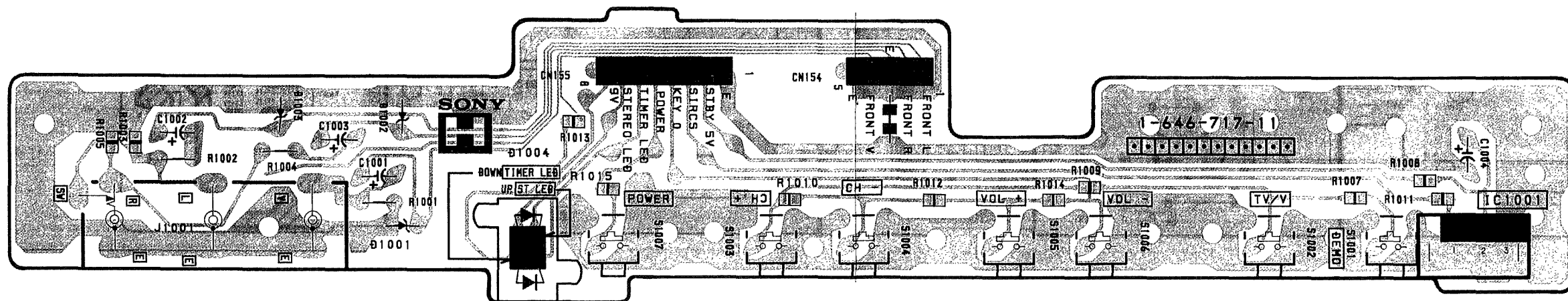
— A Board —



— E Board (KV-32TW77/32TW78 only) —



— H Board —

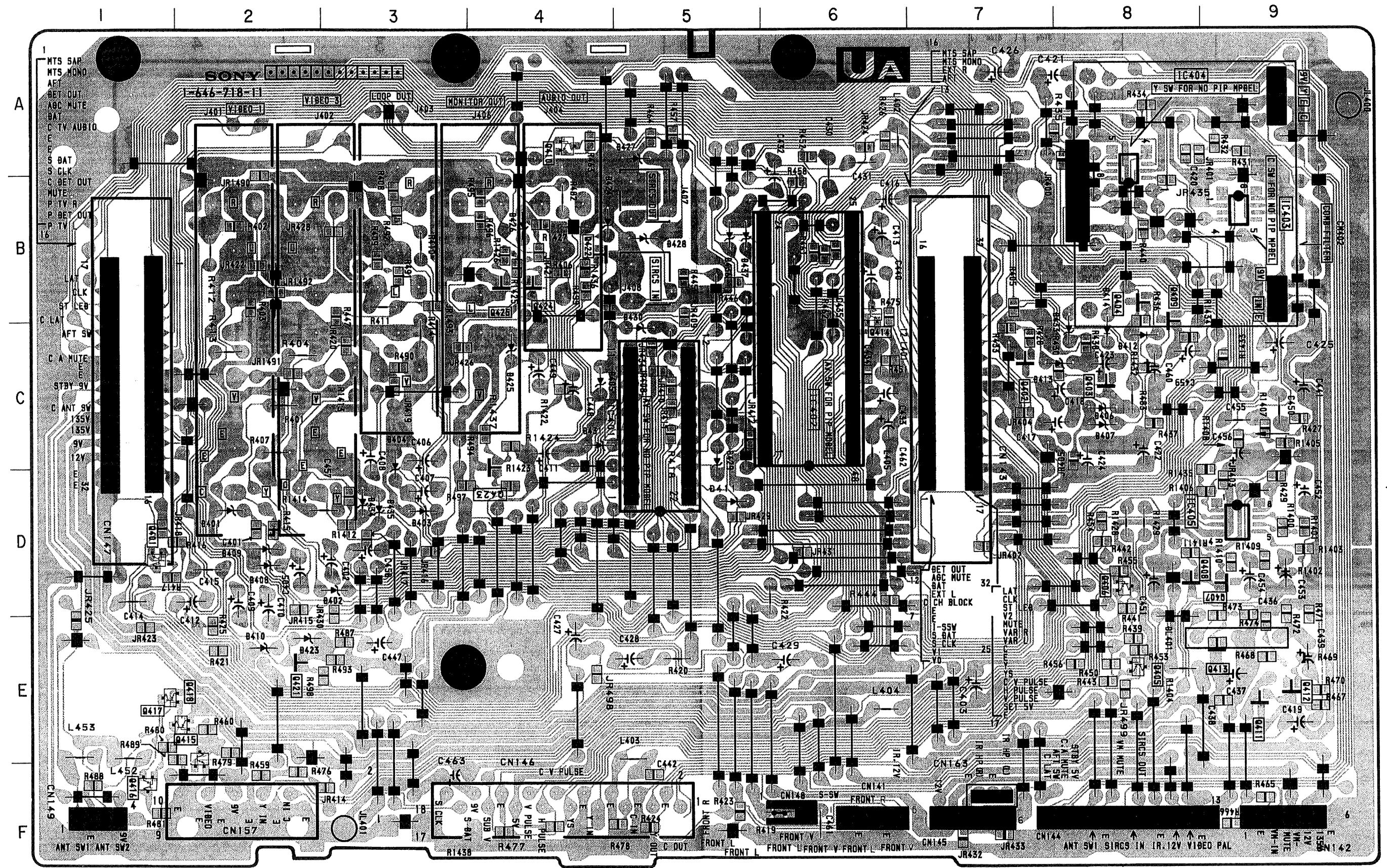


A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P



UA
AV SW
AV INPUT
AV OUTPUT

- UA Board -



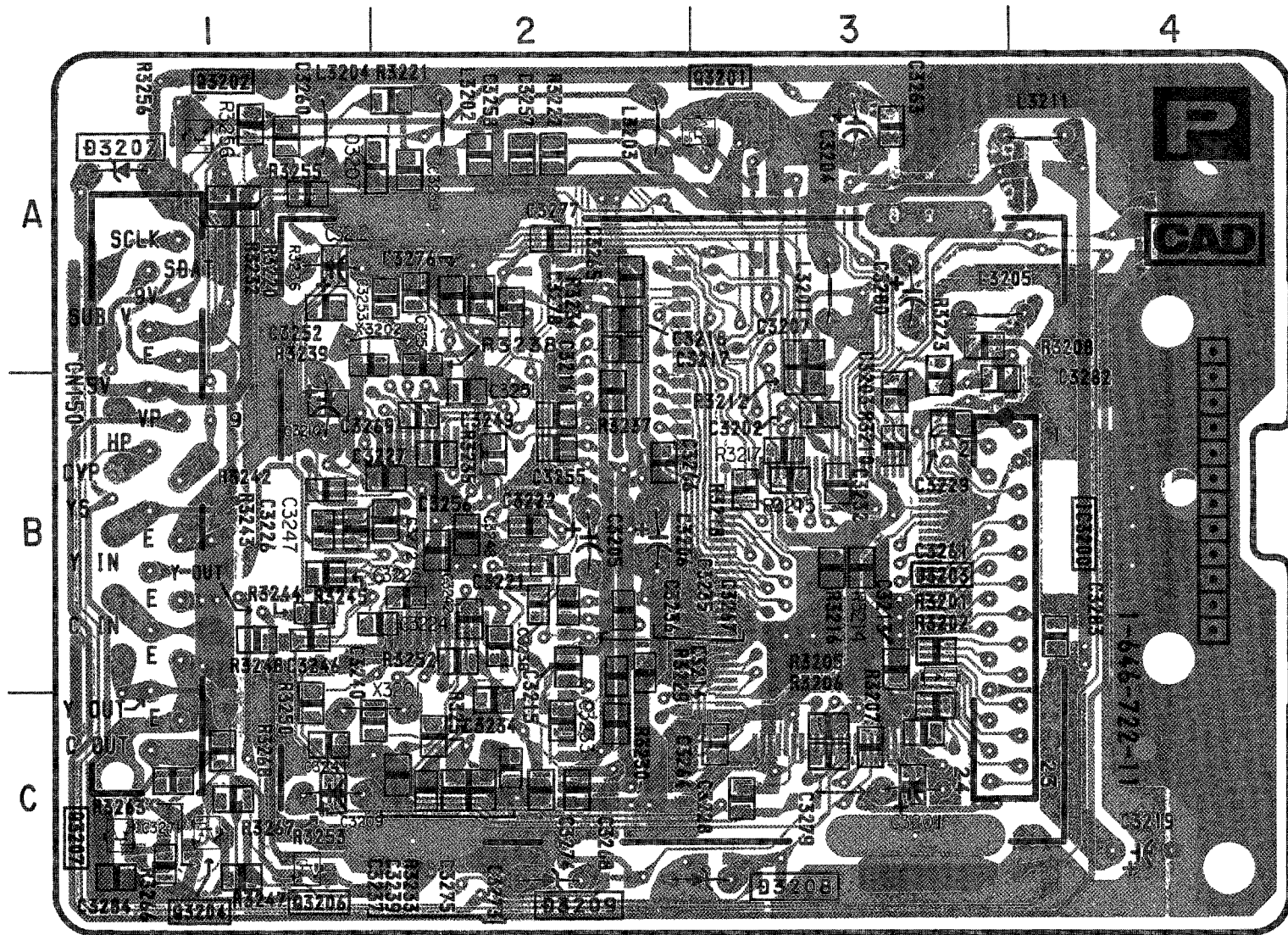
• UA BOARD

IC	
IC402	C - 5
TRANSISTOR	
Q401	D - 1
Q405	E - 8
Q406	D - 8
Q414	B - 6
DIODE	
D401	D - 2
D402	D - 3
D405	C - 4
D408	D - 2
D436	B - 5
D437	B - 5

P

[PICTURE IN PICTURE]

— P Board (Conductor Side) —

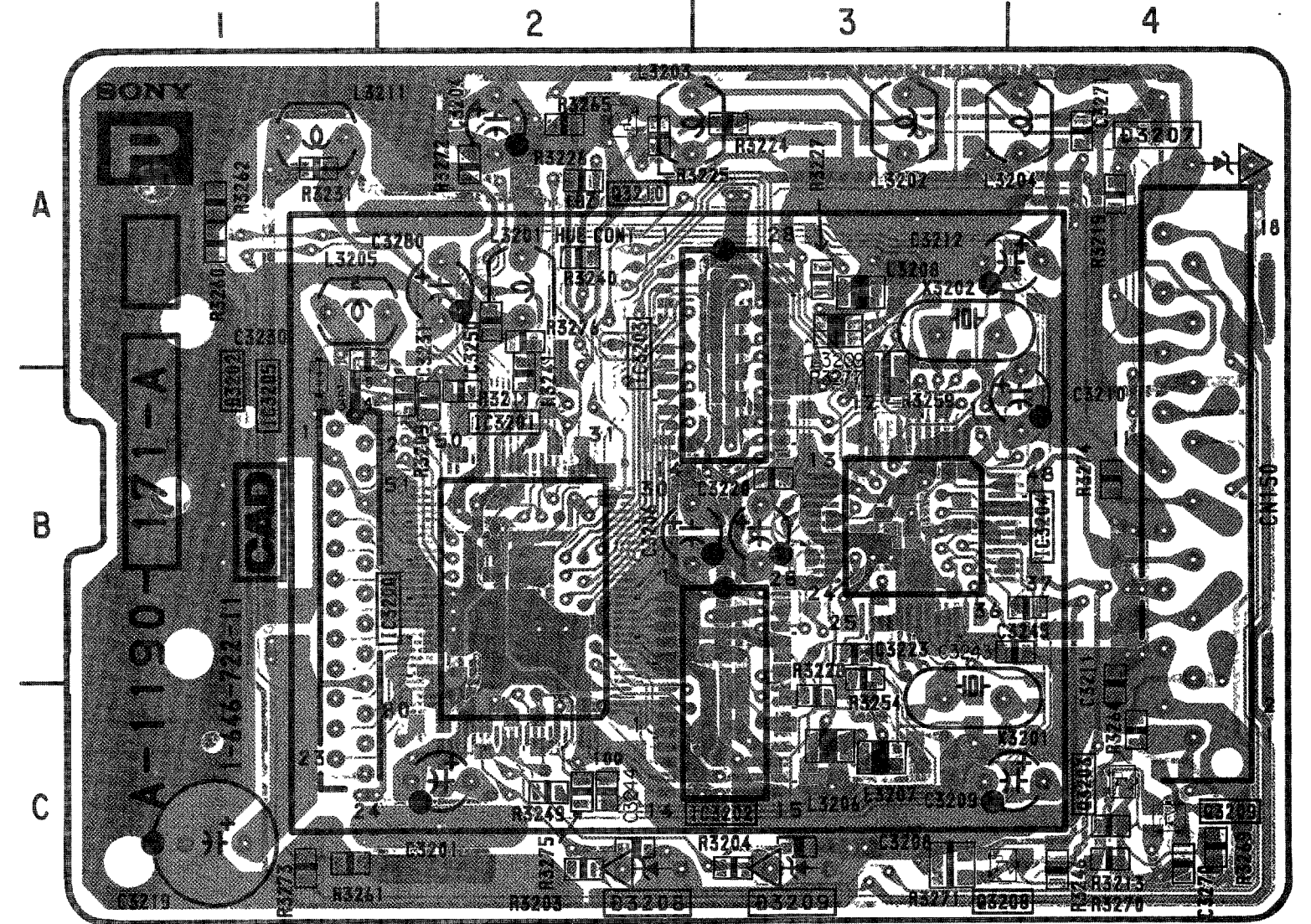


- : Pattern on the side which is seen.
- : Pattern of the rear side.

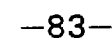
• P BOARD

IC		
	(Conductor Side)	(Component Side)
IC3200	B - 4	B - 1
IC3201		B - 2
IC3202		B - 3
IC3203		A - 3
IC3204		B - 3
IC3205		B - 1
TRANSISTOR		
	(Conductor Side)	(Component Side)
Q3201	A - 3	
Q3202	A - 1	
Q3203	B - 3	C - 4
Q3204	C - 1	
Q3206	C - 1	
Q3207	C - 1	
Q3208		C - 3
Q3209		C - 4
Q3210		A - 2
DIODE		
	(Conductor Side)	(Component Side)
D3202		B - 1
D3203		B - 3
D3208	C - 3	C - 2
D3209	C - 2	C - 3
CRYSTAL		
	(Conductor Side)	(Component Side)
X3201	C - 2	C - 3
X3202	A - 2	A - 3

— P Board (Component Side) —

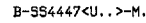


- : Pattern on the side which is seen.
- : Pattern of the rear side.



-86-

A
B
C
D
E
F
G
H
I
J
K
L
M
N
O



B-SS 4442<U..>- M <WAVELIST>

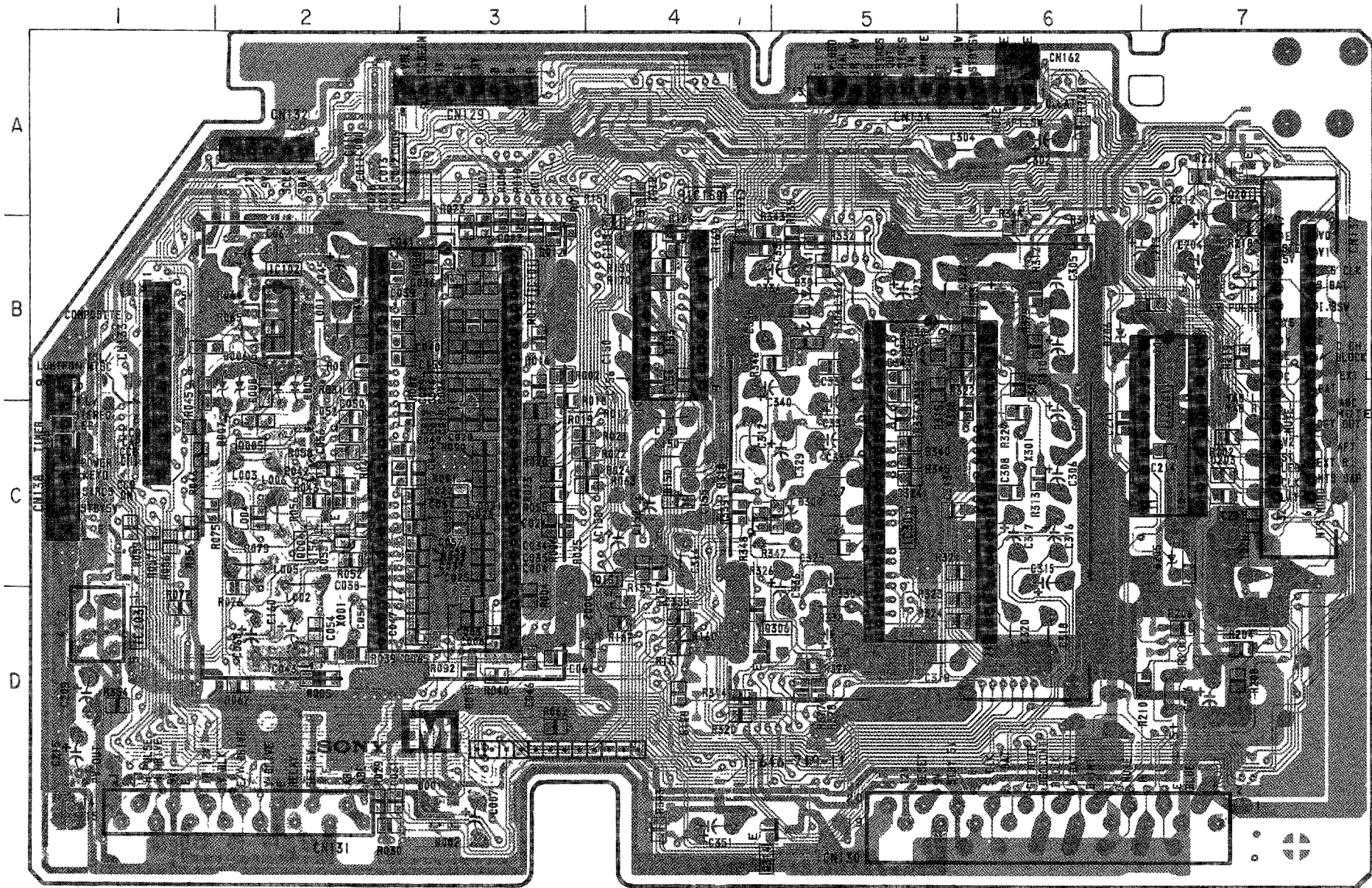


Y80	Y80
Billets)	(Anstet)

M

Y/C/J CONTROL
AUDIO CONTROL
CLOSED CAPTION

— M Board (Conductor Side) —

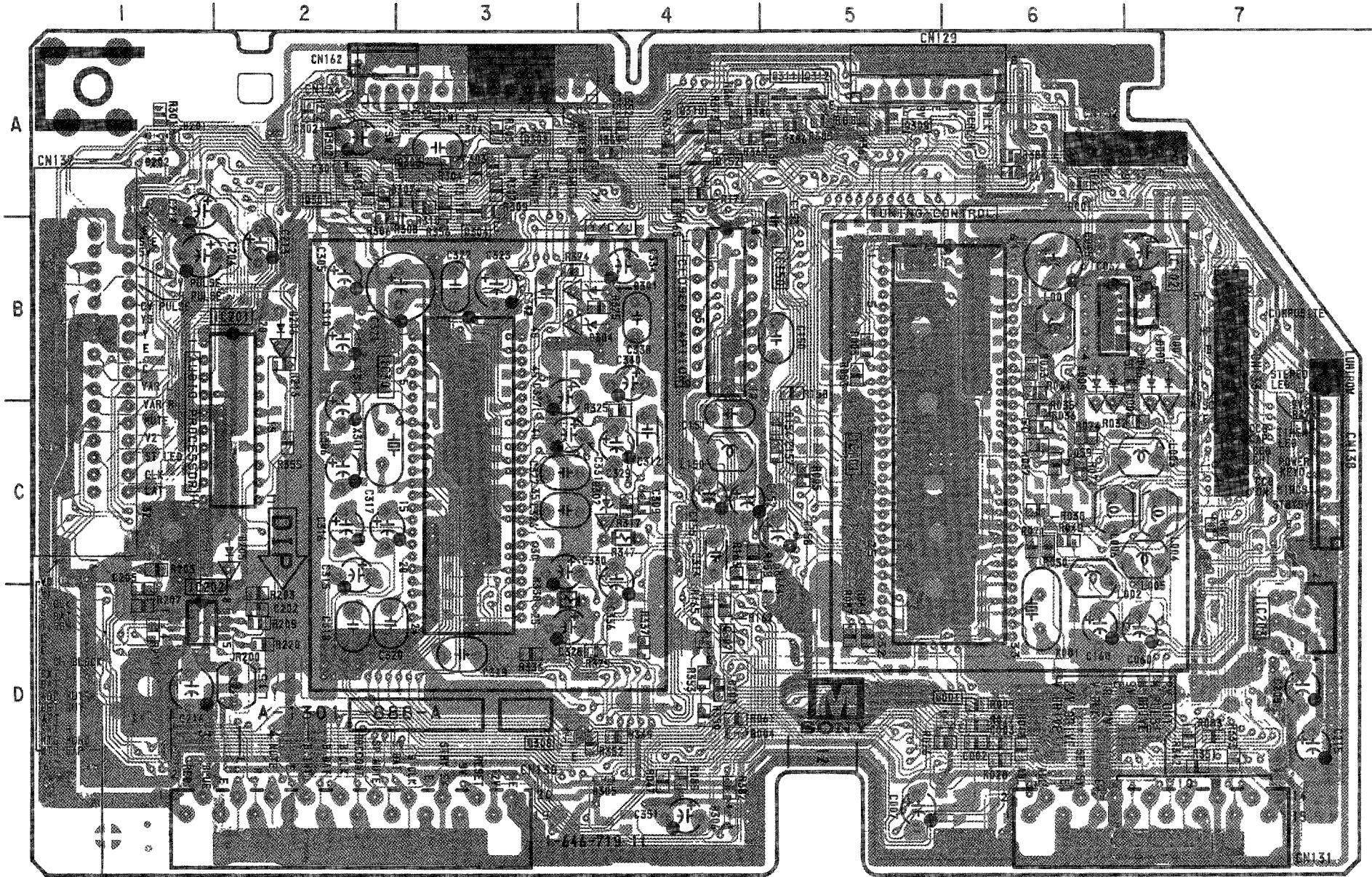


• : Pattern on the side which is seen.
• : Pattern of the rear side.

• M BOARD

IC		
	(Conductor Side)	(Component Side)
IC101	C-3	B-5
IC102	B-2	B-7
IC150	B-4	B-4
IC201		B-2
IC202		D-1
IC301	B-5	B-3
TRANSISTOR		
	(Conductor Side)	(Component Side)
Q001		D-6
Q002	D-4	
Q004	C-2	D-4
Q005	C-2	
Q151	D-4	
Q201	A-7	
Q301		A-2
Q302		A-2
Q307		D-4
Q308		D-3
Q314	D-5	
DIODE		
	(Conductor Side)	(Component Side)
D001	D-3	
D002	D-3	
D004		D-4
D005	D-2	
D006	B-2	B-6
D007	B-2	B-7
D008	B-2	B-7
D009	B-2	B-6
D150	C-4	
D201		A-1
D202		A-1
D205	C-7	C-2
D206	B-6	B-2
D301	B-5	B-4
D304	B-5	B-4
D305		D-4
D306		D-4
CRYSTAL		
	(Conductor Side)	(Component Side)
X001	D-2	D-6
X301	C-6	C-2

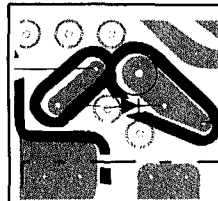
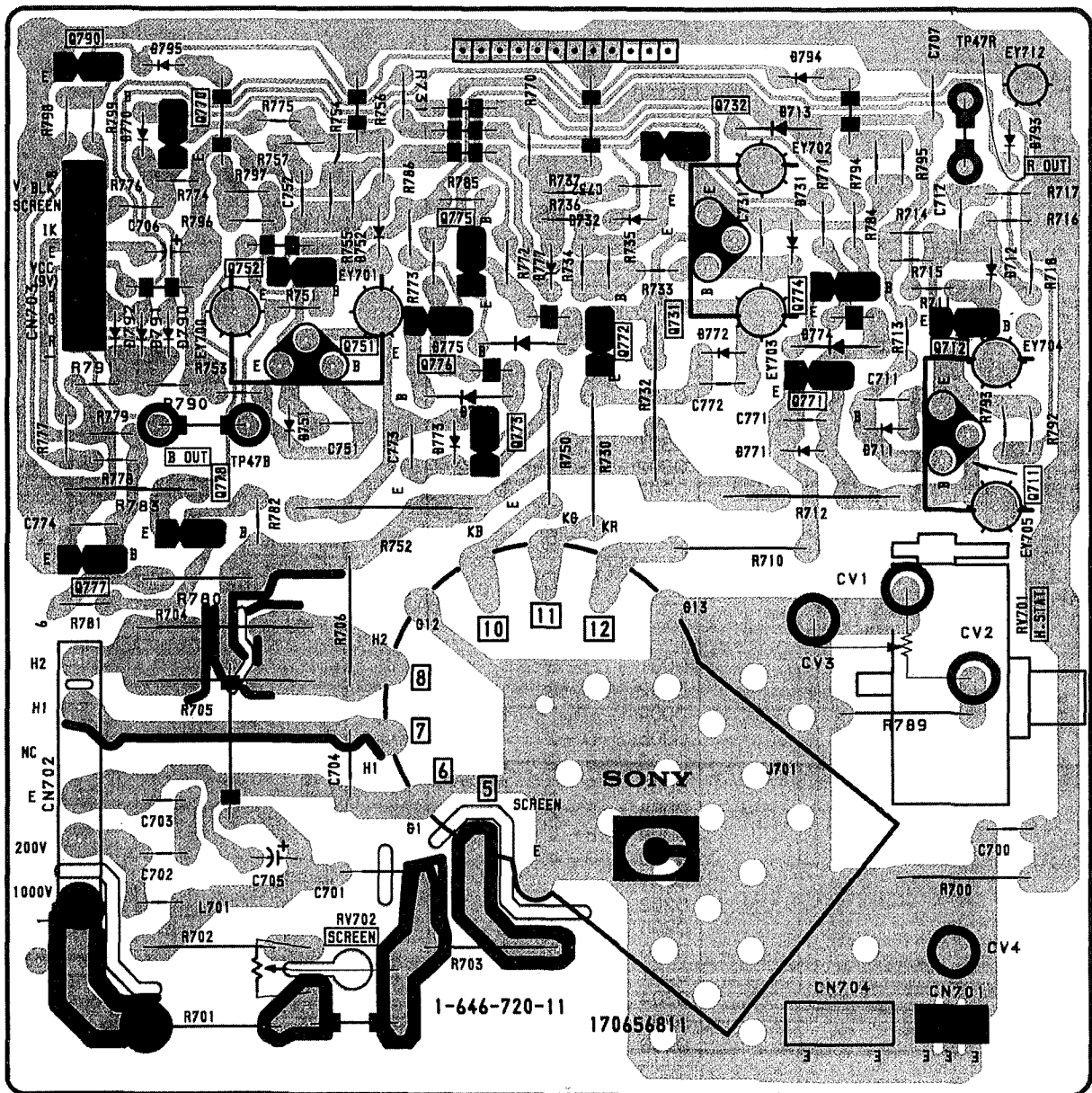
— M Board (Component Side) —



• : Pattern on the side which is seen.
• : Pattern of the rear side.

C [R, G, B OUT]

— C Board —

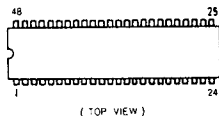


NOTE:

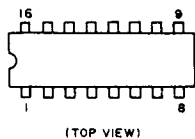
The circuit indicated as left contains high voltage of over 600 Vp-p. Care must be paid to prevent an electric shock in inspection or repairing.

6-5. SEMICONDUCTORS

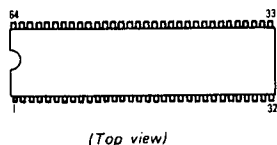
CXA1465AS
CXA1545AS



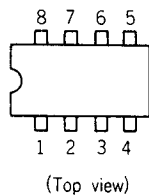
CXA1526P



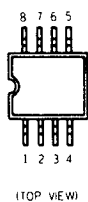
CXP80424-065S



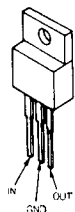
LM358P
ST24C02AB1
 μ PC358C
 μ PC393C



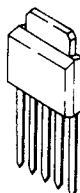
LM358PS



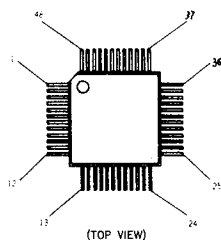
LM7805CT
LM7812CT
MC7809CT
RC7809FA



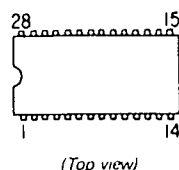
L78LR05D-MA



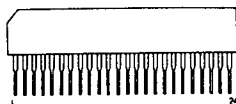
MB3512PF-EF



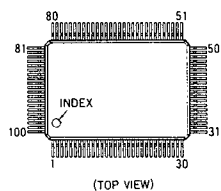
MB40176PF-G-BND-EF



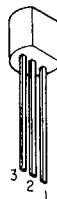
MB81461B-12RS-PSZ



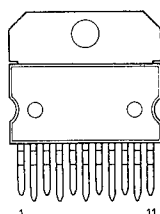
MB86144



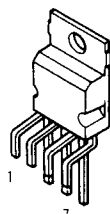
RC78L05A
 μ PC78L05J



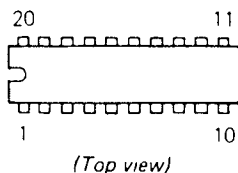
TDA2009A



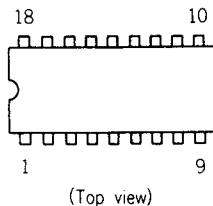
TDA8172



TDA8424



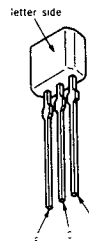
Z8612812PSC



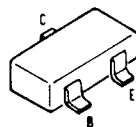
2SA1091-O
2SA1091-R



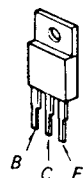
2SA1175-HFE
2SA1309A
2SC2785-HFE
2SC3311A



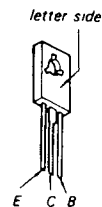
2SB709A-Q
2SB734-34
2SD601A-Q
2SD774-34



2SB1370-EF
2SC4159-E
2SD2012
2SD2061-EF



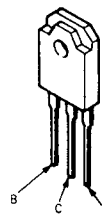
2SC2688-LK



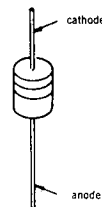
2SC4834MNP



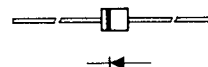
2SC4927-01
2SC4927-02



D1NS4
D1N20R
ERA81-004
ERA82-004
ERA83-006
ERA85-009
RD10ES-B
RD10ES-B2
RD12ES-B3
RD13ES-B2
RD3.6ES-B1
RD33ES-B1
RD5.1ES-B1
RD8.2ES-B3
1SS119



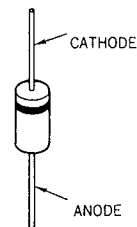
D2S4M
D2S4MF



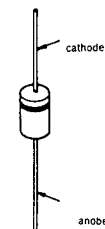
D5SC4M
D5SC4MR



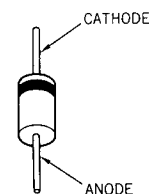
EL1Z
GP08DPKG3
RGP10GPKG3



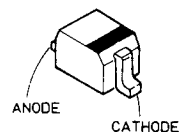
ERC06-15S
S2L20UF
S3V10SS



ERD29-08J
RGP02-17EL-6433



MA110



SECTION 7

EXPLODED VIEWS

NOTE:

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- The construction parts of an assembled part are indicated with a collation number in the remark column.

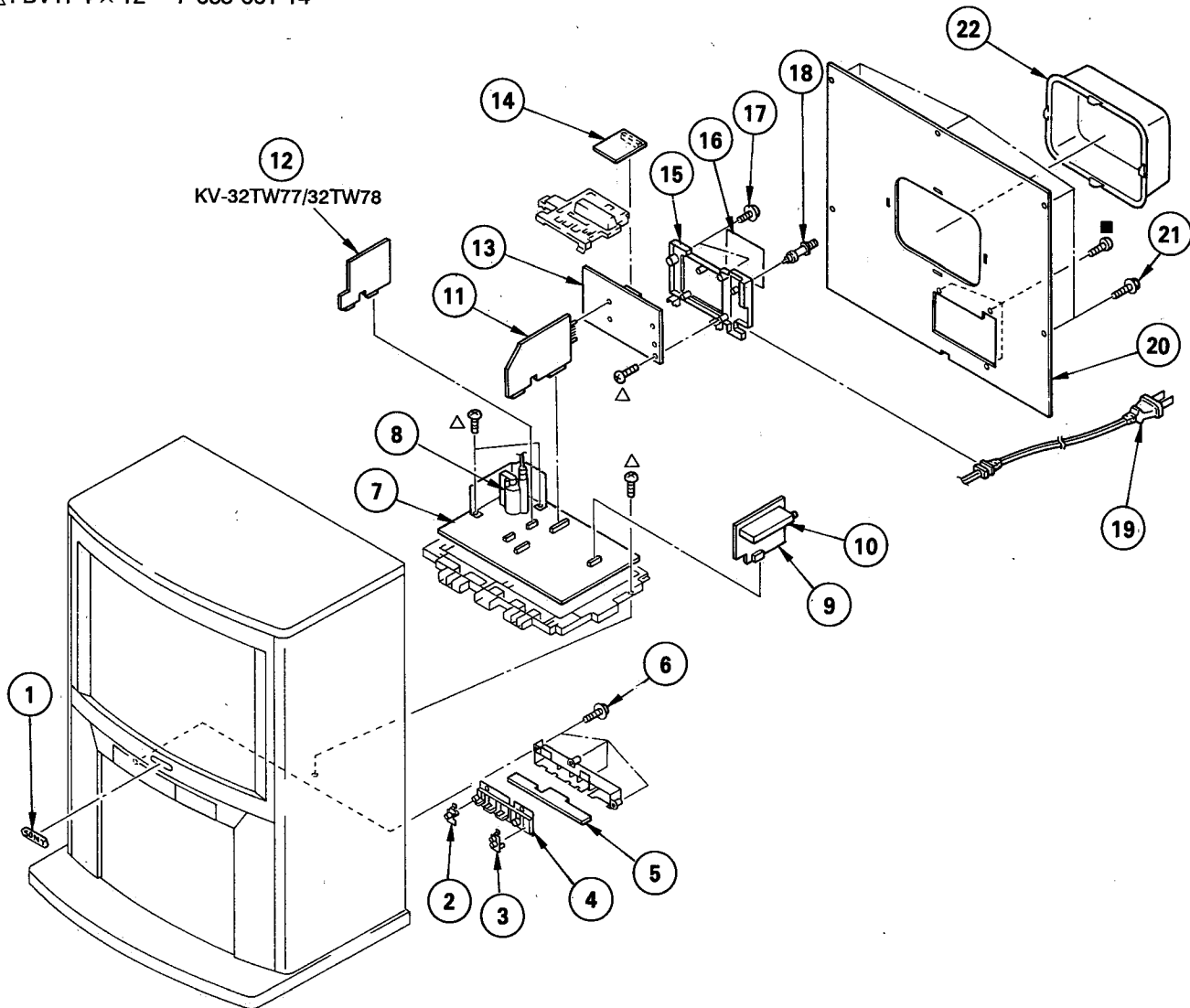
- Items marked "★" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

The components identified by shading and mark ▲ are critical for safety.
Replace only with part number specified.

7-1. CHASSIS

■: BVTP4 × 16 7-685-663-79

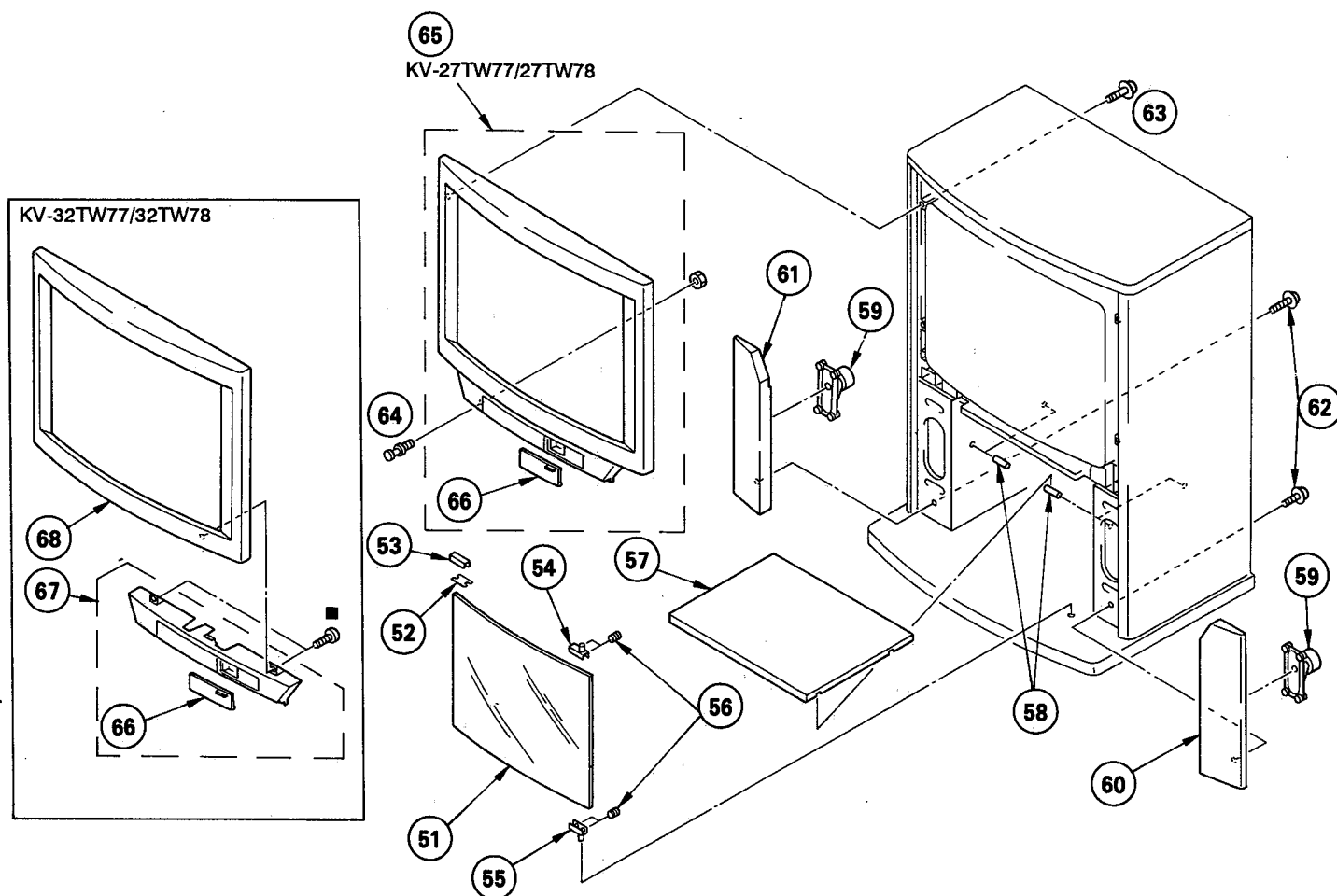
△: BVTP4 × 12 7-685-661-14



REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
1	3-704-179-12	EMBLEM (NO.9), SONY		11	*A-1306-427-A	M BOARD, COMPLETE	
2	4-040-393-01	FILTER, REMOTE		12	*A-1341-622-A	E BOARD, COMPLETE	(KV-32TW77/32TW78)
3	4-040-394-01	GUIDE, LED		13	*A-1394-415-A	UA BOARD, COMPLETE	
4	4-040-401-01	BUTTON, MULTI		14	*A-1195-062-A	P BOARD, COMPLETE	
5	*1-646-717-11	H BOARD		15	4-039-524-01	TERMINAL BOARD, ANTENNA	
6	4-319-520-11	SCREW, SPECIAL (+PW4X30)		16	4-039-834-01	LABEL, TERMINAL	
7	*A-1346-112-A	D BOARD, COMPLETE	(KV-32TW77/32TW78)	17	4-382-854-11	SCREW (M3X10), P, SW (+)	
7	*A-1346-129-A	D BOARD, COMPLETE	(KV-27TW77/27TW78)	18	1-573-657-11	PLUG, F-PIN	
8	▲ 1-453-146-11	TRANSFORMER ASSY, FLYBACK (NX2604A3)		19	▲ 1-751-059-11	CORD, POWER (WITH CONNECTOR)	
9	*A-1297-065-A	A BOARD, COMPLETE		20	*4-040-402-01	BOARD, REAR	(KV-27TW77/27TW78)
10	▲ 8-598-039-01	TUNER BTF-WA401		20	4-040-523-01	PLATE, REAR	(KV-32TW77/32TW78)
				21	4-378-522-01	SCREW, TAPPING, HEXAGON HEAD	
				22	*4-032-338-11	COVER, NECK	

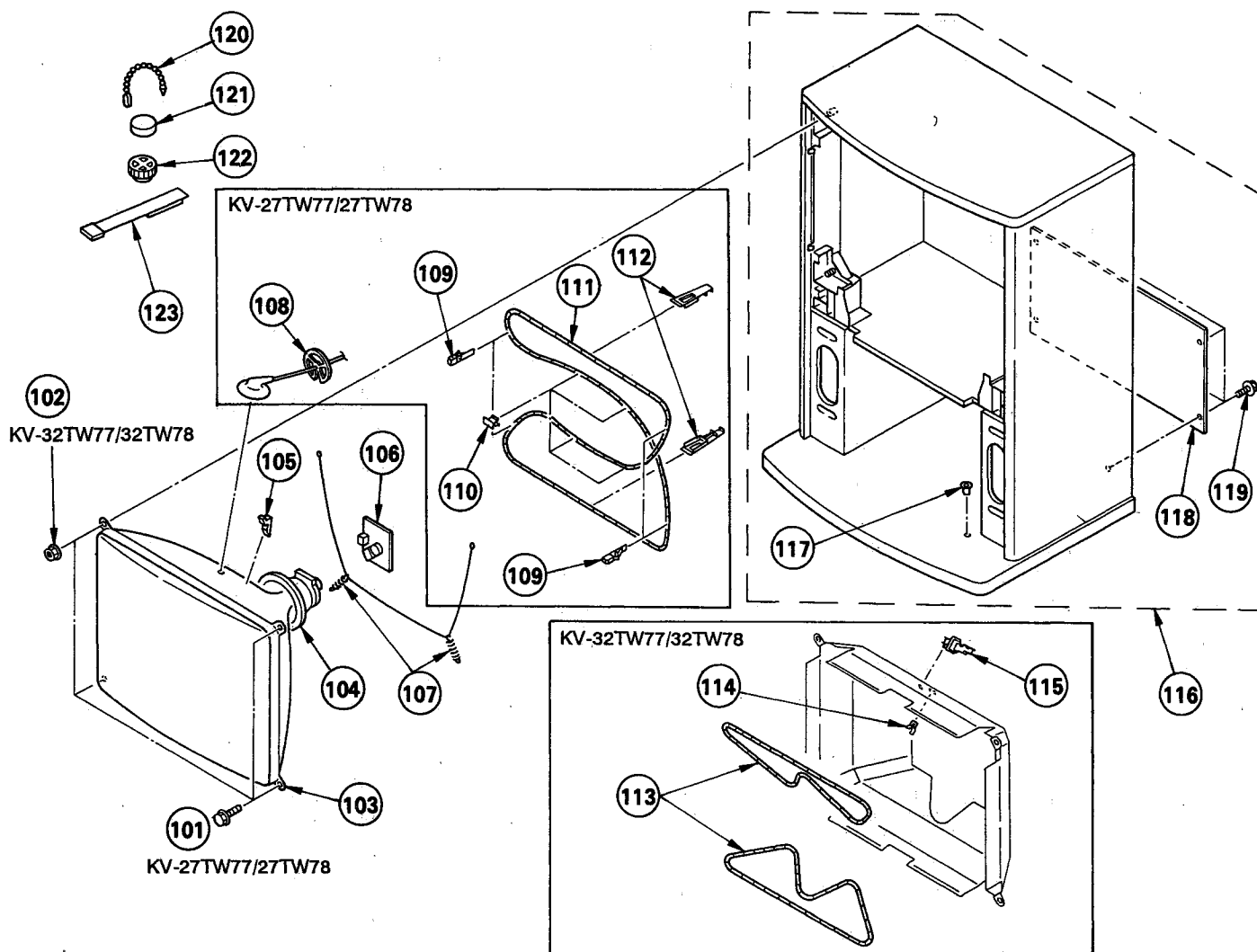
7-2. COVER

■: BVTP4 × 16 7-685-663-79



REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
51	X-4031-136-1	DOOR ASSY, GLASS	(KV-27TW77/27TW78)	61	X-4031-133-1	GRILLE ASSY (LEFT), SPEAKER	
51	X-4031-138-1	DOOR ASSY, GLASS	(KV-32TW77/32TW78)	61	X-4031-162-1	GRILLE ASSY (LEFT), SPEAKER	
52	2-352-981-01	SPACER		62	4-384-096-01	SCREW (4X16), TAPPING, +P	
53	2-359-505-01	RETAINER, MAGNET		63	4-319-520-11	SCREW, SPECIAL (+PW4X30)	
54	4-394-244-01	HINGE (A)		64	4-032-322-02	MAGNET, PUSH	
55	4-394-243-01	HINGE (B)		65	X-4031-134-1	BEZEL ASSY (KV-27TW77/27TW78)	66
56	2-112-355-01	SCREW		66	4-040-047-01	DOOR, CONTROL	
57	X-4031-137-1	PLATE ASSY, RACK	(KV-27TW77/27TW78)	67	X-4031-160-1	PANEL ASSY, CONTROL	66
57	X-4031-139-1	PLATE ASSY, RACK	(KV-32TW77/32TW78)				(KV-32TW77/32TW78)
58	4-032-323-01	PIN, RACK		68	4-032-337-11	BEZEL	(KV-32TW77/32TW78)
59	1-544-549-11	SPEAKER					
60	X-4031-132-1	GRILLE ASSY (RIGHT), SPEAKER	(KV-27TW77/27TW78)				
60	X-4031-161-1	GRILLE ASSY (RIGHT), SPEAKER	(KV-32TW77/32TW78)				

7-3. PICTURE TUBE



REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
101	4-390-505-01	SCREW (7), TAPPING (KV-27TW77/27TW78)		109	4-040-388-01	HOLDER (S), DGC (KV-27TW77/27TW78)	
102	4-387-204-01	NUT, SPECIAL, PICTURE TUBE (KV-32TW77/32TW78)		110	4-040-537-01	HOLDER (A), DGC (KV-27TW77/27TW78)	
103	△ 8-733-723-05	PICTURE TUBE (A80JYV50X) (KV-32TW77/32TW78)		111	△ 1-406-726-11	COIL, DEGAUSSING (KV-27TW77/27TW78)	
103	△ 8-733-838-05	PICTURE TUBE (A68KZJ50X) (KV-27TW77/27TW78)		112	4-040-387-01	HOLDER (M), DGC (KV-27TW77/27TW78)	
104	△ 1-451-315-41	DEFLECTION YOKE (Y34FYA) (KV-32TW77/32TW78)		113	△ 1-402-952-11	COIL, DEMAGNETIZATION (KV-32TW77/32TW78)	
104	△ 1-451-275-41	DEFLECTION YOKE (Y28PFA) (KV-27TW77/27TW78)		114	*X-371-629-01	STOPPER, WIRE (KV-32TW77/32TW78)	
105	3-704-495-01	SPACER, DY		115	4-033-681-01	HOLDER, LEAD (KV-32TW77/32TW78)	
106	*A-1331-264-A	C BOARD, COMPLETE		116	*X-4031-131-1	CABINET ASSY (KV-27TW77)	117-119
107	4-036-329-01	SPRING (B), TENSION (KV-32TW77/32TW78)		116	*X-4031-163-1	CABINET ASSY (KV-32TW77)	117-119
107	4-369-318-00	SPRING (B), TENSION (KV-27TW77/27TW78)		116	*X-4031-163-2	CABINET ASSY (KV-32TW78)	117-119
108	*3-704-312-01	HOLDER, HV CABLE (KV-27TW77/27TW78)		117	2-112-350-01	BEARING	
				118	4-040-389-01	BOARD, LOWER	
				119	4-378-522-01	SCREW, TAPPING, HEXAGON HEAD	
				120	4-308-870-00	CLIP, LEAD WIRE	
				121	1-452-032-00	MAGNET, DISK; 10MM φ	
				122	1-452-094-00	MAGNET, ROTATABLE DISK; 15MM φ	
				123	X-4306-312-0	PERMALLOY ASSY, CONVERGENCE	

The components identified by shading and mark △ are critical for safety. Replace only with part number specified.

P

SECTION 8
ELECTRICAL PARTS LIST

NOTE:

The components identified by shading and mark Δ are critical for safety.

Replace only with part number specified.

• Items marked " * " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

• All variable and adjustable resistors have characteristic curve B, unless otherwise noted.

RESISTORS

• All resistors are in ohms
• F : nonflammable

When indicating parts by reference number, please include the board name.

CAPACITORS

COILS

• MF : μ F, PF : μ F • MMH : mH, UH : μ H

• The components identified by \boxtimes in this manual have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation. Should replacement be required, replace only with the value originally used.

REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
	*A-1195-062-A	P BOARD, COMPLETE *****		C3249	1-163-117-00	CERAMIC CHIP 100PF	5% 50V
				C3250	1-163-113-00	CERAMIC CHIP 68PF	5% 50V
				C3251	1-164-232-11	CERAMIC CHIP 0.01MF	10% 50V
				C3252	1-163-103-00	CERAMIC CHIP 27PF	5% 50V
		<CAPACITOR>		C3253	1-163-101-00	CERAMIC CHIP 22PF	5% 50V
C3201	1-124-477-11	ELECT 47MF	20% 16V	C3254	1-163-141-00	CERAMIC CHIP 0.001MF	5% 50V
C3203	1-164-004-11	CERAMIC CHIP 0.1MF	10% 25V	C3255	1-163-101-00	CERAMIC CHIP 22PF	5% 50V
C3204	1-124-907-11	ELECT 10MF	20% 50V	C3256	1-164-232-11	CERAMIC CHIP 0.01MF	10% 50V
C3205	1-124-907-11	ELECT 10MF	20% 50V	C3257	1-163-117-00	CERAMIC CHIP 100PF	5% 50V
C3206	1-124-907-11	ELECT 10MF	20% 50V	C3258	1-163-113-00	CERAMIC CHIP 68PF	5% 50V
C3207	1-163-117-00	CERAMIC CHIP 100PF	5% 50V	C3259	1-163-111-00	CERAMIC CHIP 56PF	5% 50V
C3208	1-163-117-00	CERAMIC CHIP 100PF	5% 50V	C3260	1-163-119-00	CERAMIC CHIP 120PF	5% 50V
C3209	1-123-382-00	ELECT 3.3MF	20% 50V	C3261	1-163-141-00	CERAMIC CHIP 0.001MF	5% 50V
C3210	1-124-477-11	ELECT 47MF	20% 16V	C3263	1-163-141-00	CERAMIC CHIP 0.001MF	5% 50V
C3212	1-123-382-00	ELECT 3.3MF	20% 50V	C3264	1-165-319-11	CERAMIC CHIP 0.1MF	5% 50V
C3213	1-164-346-11	CERAMIC CHIP 1MF	16V	C3265	1-163-141-00	CERAMIC CHIP 0.001MF	5% 50V
C3214	1-164-346-11	CERAMIC CHIP 1MF	16V	C3266	1-163-141-00	CERAMIC CHIP 0.001MF	5% 50V
C3215	1-164-346-11	CERAMIC CHIP 1MF	16V	C3267	1-163-141-00	CERAMIC CHIP 0.001MF	5% 50V
C3216	1-164-005-11	CERAMIC CHIP 0.47MF	25V	C3268	1-163-141-00	CERAMIC CHIP 0.001MF	5% 50V
C3217	1-164-346-11	CERAMIC CHIP 1MF	16V	C3269	1-163-141-00	CERAMIC CHIP 0.001MF	5% 50V
C3218	1-164-346-11	CERAMIC CHIP 1MF	16V	C3270	1-165-319-11	CERAMIC CHIP 0.1MF	50V
C3219	1-126-103-11	ELECT 470MF	20% 16V	C3271	1-165-319-11	CERAMIC CHIP 0.1MF	50V
C3220	1-164-346-11	CERAMIC CHIP 1MF	16V	C3272	1-165-319-11	CERAMIC CHIP 0.1MF	50V
C3221	1-164-346-11	CERAMIC CHIP 1MF	16V	C3273	1-163-109-00	CERAMIC CHIP 47PF	5% 50V
C3222	1-164-336-11	CERAMIC CHIP 0.33MF	25V	C3274	1-163-101-00	CERAMIC CHIP 22PF	5% 50V
C3223	1-164-336-11	CERAMIC CHIP 0.33MF	25V	C3275	1-163-101-00	CERAMIC CHIP 22PF	5% 50V
C3224	1-164-222-11	CERAMIC CHIP 0.22MF	25V	C3276	1-163-111-00	CERAMIC CHIP 56PF	5% 50V
C3225	1-164-222-11	CERAMIC CHIP 0.22MF	25V	C3277	1-163-101-00	CERAMIC CHIP 22PF	5% 50V
C3226	1-164-005-11	CERAMIC CHIP 0.47MF	25V	C3278	1-163-101-00	CERAMIC CHIP 22PF	5% 50V
C3227	1-164-346-11	CERAMIC CHIP 1MF	16V	C3279	1-163-141-00	CERAMIC CHIP 0.001MF	5% 50V
C3228	1-163-117-00	CERAMIC CHIP 100PF	5% 50V	C3280	1-124-907-11	ELECT 10MF	20% 50V
C3229	1-163-093-00	CERAMIC CHIP 10PF	5% 50V	C3282	1-164-346-11	CERAMIC CHIP 1MF	16V
C3230	1-163-141-00	CERAMIC CHIP 0.001MF	5% 50V			<CONNECTOR>	
C3231	1-163-125-00	CERAMIC CHIP 220PF	5% 50V	CN150	1-573-297-11	CONNECTOR, BOARD TO BOARD 18P	
C3232	1-163-117-00	CERAMIC CHIP 100PF	5% 50V			<DIODE>	
C3233	1-164-232-11	CERAMIC CHIP 0.01MF	10% 50V	D3202	8-719-031-68	DIODE HVU359TRF	
C3234	1-164-232-11	CERAMIC CHIP 0.01MF	10% 50V	D3203	8-719-404-46	DIODE MA110	
C3235	1-164-232-11	CERAMIC CHIP 0.01MF	10% 50V	D3208	8-719-110-17	DIODE RD10ESB2	
C3236	1-164-232-11	CERAMIC CHIP 0.01MF	10% 50V	D3209	8-719-110-17	DIODE RD10ESB2	
C3237	1-164-232-11	CERAMIC CHIP 0.01MF	10% 50V			<IC>	
C3238	1-163-101-00	CERAMIC CHIP 22PF	5% 50V	IC3200	8-759-971-56	IC MB81461B-12RS-PSZ	
C3239	1-163-141-00	CERAMIC CHIP 0.001MF	5% 50V	IC3201	8-759-093-29	IC MB86144BPF-G-BND	
C3240	1-163-101-00	CERAMIC CHIP 22PF	5% 50V	IC3202	8-759-093-28	IC MB40176PF-G-BND-EF	
C3241	1-163-103-00	CERAMIC CHIP 27PF	5% 50V	IC3203	8-759-093-28	IC MB40176PF-G-BND-EF	
C3242	1-164-232-11	CERAMIC CHIP 0.01MF	10% 50V	IC3204	8-759-093-26	IC MB3512PF-EF	
C3243	1-163-117-00	CERAMIC CHIP 100PF	5% 50V				
C3244	1-163-113-00	CERAMIC CHIP 68PF	5% 50V				
C3245	1-164-232-11	CERAMIC CHIP 0.01MF	10% 50V				
C3246	1-164-232-11	CERAMIC CHIP 0.01MF	10% 50V				
C3247	1-163-033-00	CERAMIC CHIP 0.022MF	50V				
C3248	1-163-125-00	CERAMIC CHIP 220PF	5% 50V				

P A

REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
IC3205	8-759-243-19	IC TC7SU04F		R3238	1-216-049-00	METAL GLAZE 1K 5%	1/10W
<COIL>				R3239	1-216-043-00	METAL GLAZE 560 5%	1/10W
L3201	1-410-470-11	INDUCTOR 10UH		R3241	1-216-057-00	METAL GLAZE 2.2K 5%	1/10W
L3202	1-408-424-00	INDUCTOR 180UH		R3242	1-216-049-00	METAL GLAZE 1K 5%	1/10W
L3203	1-408-424-00	INDUCTOR 180UH		R3243	1-216-025-00	METAL GLAZE 100 5%	1/10W
L3204	1-410-476-11	INDUCTOR 33UH		R3244	1-216-025-00	METAL GLAZE 100 5%	1/10W
L3205	1-410-470-11	INDUCTOR 10UH		R3245	1-216-025-00	METAL GLAZE 100 5%	1/10W
L3206	1-410-387-11	INDUCTOR 33UH		R3246	1-216-069-00	METAL GLAZE 6.8K 5%	1/10W
L3207	1-410-387-11	INDUCTOR 33UH		R3247	1-216-063-00	METAL GLAZE 3.9K 5%	1/10W
L3208	1-410-387-11	INDUCTOR 33UH		R3248	1-216-295-00	METAL GLAZE 0 5%	1/10W
L3209	1-410-387-11	INDUCTOR 33UH		R3249	1-216-057-00	METAL GLAZE 2.2K 5%	1/10W
<TRANSISTOR>				R3250	1-216-043-00	METAL GLAZE 560 5%	1/10W
Q3201	8-729-422-36	TRANSISTOR 2SB709A-Q		R3251	1-216-049-00	METAL GLAZE 1K 5%	1/10W
Q3202	8-729-422-27	TRANSISTOR 2SD601A-Q		R3252	1-216-043-00	METAL GLAZE 560 5%	1/10W
Q3203	8-729-422-36	TRANSISTOR 2SB709A-Q		R3253	1-216-065-00	METAL GLAZE 4.7K 5%	1/10W
Q3204	8-729-422-36	TRANSISTOR 2SB709A-Q		R3254	1-216-043-00	METAL GLAZE 560 5%	1/10W
Q3206	8-729-422-27	TRANSISTOR 2SD601A-Q		R3255	1-216-041-00	METAL GLAZE 470 5%	1/10W
Q3207	8-729-422-36	TRANSISTOR 2SB709A-Q		R3256	1-216-043-00	METAL GLAZE 560 5%	1/10W
Q3208	8-729-422-27	TRANSISTOR 2SD601A-Q		R3259	1-216-298-00	METAL GLAZE 2.2 5%	1/10W
Q3209	8-729-422-36	TRANSISTOR 2SB709A-Q		R3260	1-216-073-00	METAL GLAZE 10K 5%	1/10W
Q3210	8-729-422-36	TRANSISTOR 2SB709A-Q		R3263	1-216-025-00	METAL GLAZE 100 5%	1/10W
<RESISTOR>				R3264	1-216-025-00	METAL GLAZE 100 5%	1/10W
R3201	1-216-097-00	METAL GLAZE 100K 5%	1/10W	R3265	1-216-049-00	METAL GLAZE 1K 5%	1/10W
R3202	1-216-073-00	METAL GLAZE 10K 5%	1/10W	R3266	1-216-057-00	METAL GLAZE 2.2K 5%	1/10W
R3203	1-216-025-00	METAL GLAZE 100 5%	1/10W	R3267	1-216-055-00	METAL GLAZE 1.8K 5%	1/10W
R3204	1-216-025-00	METAL GLAZE 100 5%	1/10W	R3268	1-216-053-00	METAL GLAZE 1.5K 5%	1/10W
R3205	1-216-121-00	METAL GLAZE 1M 5%	1/10W	R3269	1-216-057-00	METAL GLAZE 2.2K 5%	1/10W
R3207	1-216-295-00	METAL GLAZE 0 5%	1/10W	R3270	1-216-657-11	METAL CHIP 1.8K 0.50%	1/10W
R3208	1-216-097-00	METAL GLAZE 100K 5%	1/10W	R3271	1-216-655-11	METAL CHIP 1.5K 0.50%	1/10W
R3209	1-216-079-00	METAL GLAZE 18K 5%	1/10W	R3273	1-216-073-00	METAL GLAZE 10K 5%	1/10W
R3210	1-216-089-00	METAL GLAZE 47K 5%	1/10W	R3274	1-216-049-00	METAL GLAZE 1K 5%	1/10W
R3211	1-216-073-00	METAL GLAZE 10K 5%	1/10W	R3275	1-216-049-00	METAL GLAZE 1K 5%	1/10W
R3212	1-216-073-00	METAL GLAZE 10K 5%	1/10W	R3276	1-216-049-00	METAL GLAZE 1K 5%	1/10W
R3213	1-216-075-00	METAL GLAZE 12K 5%	1/10W	R3277	1-216-298-00	METAL GLAZE 2.2 5%	1/10W
R3214	1-216-121-00	METAL GLAZE 1M 5%	1/10W	<CRYSTAL>			
R3215	1-216-057-00	METAL GLAZE 2.2K 5%	1/10W	X3201	1-567-878-11	VIBRATOR, CRYSTAL	
R3216	1-216-057-00	METAL GLAZE 2.2K 5%	1/10W	X3202	1-567-878-11	VIBRATOR, CRYSTAL	
R3217	1-216-057-00	METAL GLAZE 2.2K 5%	1/10W	*****			
R3218	1-216-049-00	METAL GLAZE 1K 5%	1/10W	*A-1297-065-A A BOARD, COMPLETE			
R3219	1-216-049-00	METAL GLAZE 1K 5%	1/10W	*****			
R3220	1-216-049-00	METAL GLAZE 1K 5%	1/10W	<CAPACITOR>			
R3221	1-216-655-11	METAL CHIP 1.5K 0.50%	1/10W	C173	1-164-232-11	CERAMIC CHIP 0.01MF	10% 50V
R3222	1-216-655-11	METAL CHIP 1.5K 0.50%	1/10W	C174	1-164-232-11	CERAMIC CHIP 0.01MF	10% 50V
R3223	1-216-025-00	METAL GLAZE 100 5%	1/10W	C175	1-126-103-11	ELECT 470MF	20% 16V
R3224	1-216-049-00	METAL GLAZE 1K 5%	1/10W	C176	1-126-103-11	ELECT 470MF	20% 16V
R3225	1-216-025-00	METAL GLAZE 100 5%	1/10W	C177	1-124-907-11	ELECT 10MF	20% 50V
R3226	1-216-085-00	METAL GLAZE 33K 5%	1/10W	C178	1-126-101-11	ELECT 100MF	20% 16V
R3227	1-216-647-11	METAL CHIP 680 0.50%	1/10W	C179	1-124-916-11	ELECT 22MF	20% 25V
R3228	1-216-045-00	METAL GLAZE 680 5%	1/10W	C181	1-164-161-11	CERAMIC CHIP 0.0022MF	10% 50V
R3229	1-216-073-00	METAL GLAZE 10K 5%	1/10W	<CONNECTOR>			
R3230	1-216-073-00	METAL GLAZE 10K 5%	1/10W	CN103	*1-564-519-11	PLUG, CONNECTOR 4P	
R3231	1-216-001-00	METAL GLAZE 10 5%	1/10W	CN151	*1-573-979-11	CONNECTOR, BOARD TO BOARD 11P	
R3232	1-216-083-00	METAL GLAZE 27K 5%	1/10W	CN152	1-750-394-11	PIN, CONNECTOR (STAKING) 32P	
R3233	1-216-049-00	METAL GLAZE 1K 5%	1/10W	CN164	*1-564-505-11	PLUG, CONNECTOR 2P	
R3234	1-216-651-11	METAL CHIP 1K 0.50%	1/10W	CN165	*1-564-505-11	PLUG, CONNECTOR 2P	
R3235	1-216-043-00	METAL GLAZE 560 5%	1/10W				
R3236	1-216-065-00	METAL GLAZE 4.7K 5%	1/10W				
R3237	1-216-043-00	METAL GLAZE 560 5%	1/10W				

A

M

The components identified by
shading and mark Δ are critical
for safety.
Replace only with part number
specified.

REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
<DIODE>							
D170	8-719-110-76	DIODE RD33ESB1		C058	1-163-037-11	CERAMIC CHIP 0.022MF	10% 25V
<COIL>				C059	1-163-125-00	CERAMIC CHIP 220PF	5% 50V
L170	1-408-408-00	INDUCTOR 8.2UH		C060	1-124-903-11	ELECT 1MF	20% 50V
L171	1-408-408-00	INDUCTOR 8.2UH		C061	1-163-117-00	CERAMIC CHIP 100PF	5% 50V
L172	1-408-408-00	INDUCTOR 8.2UH		C062	1-124-907-11	ELECT 10MF	20% 50V
<RESISTOR>				C150	1-136-165-00	FILM 0.1MF	5% 50V
R170	1-216-025-00	METAL GLAZE 100 5% 1/10W		C151	1-136-175-00	FILM 0.068MF	5% 50V
R174	1-216-689-11	METAL GLAZE 39K 5% 1/10W		C152	1-124-907-11	ELECT 10MF	20% 50V
R176	1-216-295-00	METAL GLAZE 0 5% 1/10W		C153	1-137-367-11	FILM 0.0033MF	5% 50V
R177	1-215-900-11	METAL OXIDE 22K 5% 2W	F	C154	1-163-038-00	CERAMIC CHIP 0.1MF	25V
R179	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W		C155	1-124-907-11	ELECT 10MF	20% 50V
R187	1-216-083-00	METAL GLAZE 27K 5% 1/10W		C156	1-163-135-00	CERAMIC CHIP 560PF	5% 50V
R193	1-216-037-00	METAL GLAZE 330 5% 1/10W		C157	1-163-038-00	CERAMIC CHIP 0.1MF	25V
<TUNER>				C158	1-124-903-11	ELECT 1MF	20% 50V
TU101A 8-598-039-01 TUNER BTF WA401				C160	1-124-903-11	ELECT 1MF	20% 50V
*****				C201	1-163-017-00	CERAMIC CHIP 0.0047MF	10% 50V
*A-1306-427-A M BOARD, COMPLETE				C202	1-163-125-00	CERAMIC CHIP 220PF	5% 50V
*****				C203	1-163-989-11	CERAMIC CHIP 0.033MF	10% 25V
<CAPACITOR>				C204	1-126-101-11	ELECT 100MF	20% 16V
C002	1-163-809-11	CERAMIC CHIP 0.047MF	10% 25V	C205	1-163-125-00	CERAMIC CHIP 220PF	5% 50V
C003	1-163-001-11	CERAMIC CHIP 220PF	10% 50V	C211	1-163-989-11	CERAMIC CHIP 0.033MF	10% 25V
C005	1-163-125-00	CERAMIC CHIP 220PF	5% 50V	C212	1-124-902-00	ELECT 0.47MF	20% 50V
C006	1-163-125-00	CERAMIC CHIP 220PF	5% 50V	C213	1-124-902-00	ELECT 0.47MF	20% 50V
C007	1-124-903-11	ELECT 1MF	20% 50V	C214	1-163-017-00	CERAMIC CHIP 0.0047MF	10% 50V
C008	1-163-125-00	CERAMIC CHIP 220PF	5% 50V	C216	1-124-478-11	ELECT 100MF	20% 25V
C009	1-163-125-00	CERAMIC CHIP 220PF	5% 50V	C301	1-163-117-00	CERAMIC CHIP 100PF	5% 50V
C010	1-163-125-00	CERAMIC CHIP 220PF	5% 50V	C305	1-124-907-11	ELECT 10MF	20% 50V
C012	1-163-125-00	CERAMIC CHIP 220PF	5% 50V	C306	1-124-902-00	ELECT 0.47MF	20% 50V
C013	1-163-125-00	CERAMIC CHIP 220PF	5% 50V	C307	1-163-125-00	CERAMIC CHIP 220PF	5% 50V
C014	1-163-125-00	CERAMIC CHIP 220PF	5% 50V	C308	1-163-099-00	CERAMIC CHIP 18PF	5% 50V
C015	1-163-125-00	CERAMIC CHIP 220PF	5% 50V	C310	1-124-916-11	ELECT 22MF	20% 25V
C016	1-163-125-00	CERAMIC CHIP 220PF	5% 50V	C311	1-124-903-11	ELECT 1MF	20% 50V
C017	1-163-125-00	CERAMIC CHIP 220PF	5% 50V	C313	1-163-003-11	CERAMIC CHIP 330PF	10% 50V
C018	1-163-125-00	CERAMIC CHIP 220PF	5% 50V	C315	1-124-907-11	ELECT 10MF	20% 50V
C019	1-163-125-00	CERAMIC CHIP 220PF	5% 50V	C316	1-124-907-11	ELECT 10MF	20% 50V
C021	1-163-125-00	CERAMIC CHIP 220PF	5% 50V	C317	1-124-907-11	ELECT 10MF	20% 50V
C022	1-163-125-00	CERAMIC CHIP 220PF	5% 50V	C318	1-136-165-00	FILM 0.1MF	5% 50V
C023	1-163-125-00	CERAMIC CHIP 220PF	5% 50V	C319	1-136-165-00	FILM 0.1MF	5% 50V
C025	1-163-125-00	CERAMIC CHIP 220PF	5% 50V	C320	1-136-165-00	FILM 0.1MF	5% 50V
C028	1-163-125-00	CERAMIC CHIP 220PF	5% 50V	C321	1-124-360-00	ELECT 1000MF	20% 16V
C029	1-163-125-00	CERAMIC CHIP 220PF	5% 50V	C322	1-136-153-00	FILM 0.01MF	5% 50V
C041	1-163-009-11	CERAMIC CHIP 0.001MF	10% 50V	C323	1-126-176-11	ELECT 220MF	20% 10V
C043	1-163-159-00	CERAMIC CHIP 12PF	2% 50V	C324	1-163-003-11	CERAMIC CHIP 330PF	10% 50V
C045	1-124-119-00	ELECT 330MF	20% 16V	C325	1-163-037-11	CERAMIC CHIP 0.022MF	10% 25V
C047	1-104-896-91	CERAMIC CHIP 24PF	2% 50V	C326	1-136-169-00	FILM 0.22MF	5% 50V
C049	1-163-125-00	CERAMIC CHIP 220PF	5% 50V	C327	1-136-169-00	FILM 0.22MF	5% 50V
C050	1-163-125-00	CERAMIC CHIP 220PF	5% 50V	C328	1-124-902-00	ELECT 0.47MF	20% 50V
C051	1-163-031-11	CERAMIC CHIP 0.01MF	5% 50V	C329	1-124-903-11	ELECT 1MF	20% 50V
C052	1-163-125-00	CERAMIC CHIP 220PF	5% 50V	C330	1-124-907-11	ELECT 10MF	20% 50V
C053	1-163-121-00	CERAMIC CHIP 150PF	5% 50V	C331	1-124-907-11	ELECT 10MF	20% 50V
C054	1-163-125-00	CERAMIC CHIP 220PF	5% 50V	C332	1-164-489-11	CERAMIC CHIP 0.22MF	10% 16V
C055	1-163-125-00	CERAMIC CHIP 220PF	5% 50V	C333	1-163-011-11	CERAMIC CHIP 0.0015MF	10% 50V
C056	1-163-125-00	CERAMIC CHIP 220PF	5% 50V	C334	1-124-902-00	ELECT 0.47MF	20% 50V
C057	1-163-017-00	CERAMIC CHIP 0.0047MF	10% 50V	C335	1-163-001-11	CERAMIC CHIP 220PF	10% 50V
<CONNECTOR>				C336	1-124-903-11	ELECT 1MF	20% 50V
				C337	1-124-902-00	ELECT 0.47MF	20% 50V
				C338	1-136-153-00	FILM 0.01MF	5% 50V
				C340	1-124-903-11	ELECT 1MF	20% 50V
				C341	1-163-005-11	CERAMIC CHIP 470PF	10% 50V
				C342	1-137-414-91	FILM 0.0047MF	10% 100V

M

REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
CN129	*1-564-523-11	PLUG, CONNECTOR 8P		R007	1-216-033-00	METAL GLAZE 220 5%	1/10W
CN130	1-573-301-11	CONNECTOR, BOARD TO BOARD 20P		R008	1-216-033-00	METAL GLAZE 220 5%	1/10W
CN131	*1-691-632-11	CONNECTOR, BOARD TO BOARD 15P		R009	1-216-033-00	METAL GLAZE 220 5%	1/10W
CN137	1-750-394-11	PIN, CONNECTOR (STAKING) 32P		R011	1-216-033-00	METAL GLAZE 220 5%	1/10W
CN138	*1-564-511-31	PLUG, CONNECTOR 8P		R012	1-216-033-00	METAL GLAZE 220 5%	1/10W
CN168	*1-564-505-11	PLUG, CONNECTOR 2P		R013	1-216-033-00	METAL GLAZE 220 5%	1/10W
<DIODE>				R016	1-216-033-00	METAL GLAZE 220 5%	1/10W
D001	8-719-404-46	DIODE MA110		R017	1-216-033-00	METAL GLAZE 220 5%	1/10W
D002	8-719-404-46	DIODE MA110		R018	1-216-033-00	METAL GLAZE 220 5%	1/10W
D004	8-719-404-46	DIODE MA110		R019	1-216-033-00	METAL GLAZE 220 5%	1/10W
D005	8-713-300-57	DIODE 1T33		R020	1-216-033-00	METAL GLAZE 220 5%	1/10W
D006	8-719-110-17	DIODE RD10ESB2		R021	1-216-073-00	METAL GLAZE 10K 5%	1/10W
D007	8-719-110-17	DIODE RD10ESB2		R022	1-216-073-00	METAL GLAZE 10K 5%	1/10W
D008	8-719-110-17	DIODE RD10ESB2		R023	1-216-033-00	METAL GLAZE 220 5%	1/10W
D009	8-719-110-17	DIODE RD10ESB2		R025	1-216-033-00	METAL GLAZE 220 5%	1/10W
D150	8-719-404-46	DIODE MA110		R026	1-216-097-00	METAL GLAZE 100K 5%	1/10W
D201	8-719-404-46	DIODE MA110		R027	1-216-121-00	METAL GLAZE 1M 5%	1/10W
D202	8-719-404-46	DIODE MA110		R028	1-216-073-00	METAL GLAZE 10K 5%	1/10W
D205	8-719-110-17	DIODE RD10ESB2		R029	1-216-065-00	METAL GLAZE 4.7K 5%	1/10W
D206	8-719-110-17	DIODE RD10ESB2		R030	1-216-073-00	METAL GLAZE 10K 5%	1/10W
D301	8-719-110-17	DIODE RD10ESB2		R031	1-216-033-00	METAL GLAZE 220 5%	1/10W
D304	8-719-110-17	DIODE RD10ESB2		R032	1-216-033-00	METAL GLAZE 220 5%	1/10W
D305	8-719-404-46	DIODE RD10ESB2		R033	1-216-033-00	METAL GLAZE 220 5%	1/10W
D306	8-719-404-46	DIODE RD10ESB2		R034	1-216-033-00	METAL GLAZE 220 5%	1/10W
<IC>				R035	1-216-033-00	METAL GLAZE 220 5%	1/10W
IC101	8-752-841-16	IC CXP80424-065S		R036	1-216-033-00	METAL GLAZE 220 5%	1/10W
IC102	8-759-043-86	IC ST24C02AB1		R037	1-216-033-00	METAL GLAZE 220 5%	1/10W
IC150	8-759-084-09	IC Z8612812PSC		R038	1-216-033-00	METAL GLAZE 220 5%	1/10W
IC201	8-759-090-21	IC TDA8424		R039	1-216-295-00	METAL GLAZE 0 5%	1/10W
IC202	8-759-983-69	IC LM358PS		R040	1-216-049-00	METAL GLAZE 1K 5%	1/10W
IC301	8-752-059-67	IC CXA1465AS		R041	1-216-033-00	METAL GLAZE 220 5%	1/10W
<JUMPER RESISTOR>				R042	1-216-049-00	METAL GLAZE 1K 5%	1/10W
JR200	1-216-295-00	METAL GLAZE 0 5%	1/10W	R043	1-216-049-00	METAL GLAZE 1K 5%	1/10W
<COIL>				R044	1-216-065-00	METAL GLAZE 4.7K 5%	1/10W
L001	1-410-470-11	INDUCTOR 10uH		R045	1-216-065-00	METAL GLAZE 4.7K 5%	1/10W
L002	1-408-414-00	INDUCTOR 27uH		R046	1-216-065-00	METAL GLAZE 4.7K 5%	1/10W
L150	1-410-470-11	INDUCTOR 10uH		R047	1-216-065-00	METAL GLAZE 4.7K 5%	1/10W
<TRANSISTOR>				R048	1-216-073-00	METAL GLAZE 10K 5%	1/10W
Q001	8-729-422-36	TRANSISTOR 2SB709A-Q		R049	1-216-049-00	METAL GLAZE 1K 5%	1/10W
Q002	8-729-422-36	TRANSISTOR 2SB709A-Q		R050	1-216-049-00	METAL GLAZE 1K 5%	1/10W
Q004	8-729-422-36	TRANSISTOR 2SB709A-Q		R051	1-216-073-00	METAL GLAZE 10K 5%	1/10W
Q005	8-729-422-27	TRANSISTOR 2SD601A-Q		R052	1-216-065-00	METAL GLAZE 4.7K 5%	1/10W
Q151	8-729-422-36	TRANSISTOR 2SD601A-Q		R053	1-216-049-00	METAL GLAZE 1K 5%	1/10W
Q201	8-729-422-27	TRANSISTOR 2SD601A-Q		R054	1-216-049-00	METAL GLAZE 1K 5%	1/10W
Q301	8-729-422-36	TRANSISTOR 2SB709A-Q		R058	1-216-073-00	METAL GLAZE 10K 5%	1/10W
Q302	8-729-422-36	TRANSISTOR 2SB709A-Q		R059	1-216-065-00	METAL GLAZE 4.7K 5%	1/10W
Q307	8-729-422-27	TRANSISTOR 2SD601A-Q		R061	1-216-077-00	METAL GLAZE 15K 5%	1/10W
Q308	8-729-422-27	TRANSISTOR 2SD601A-Q		R062	1-216-057-00	METAL GLAZE 2.2K 5%	1/10W
Q314	8-729-422-27	TRANSISTOR 2SD601A-Q		R064	1-216-065-00	METAL GLAZE 4.7K 5%	1/10W
<RESISTOR>				R065	1-216-065-00	METAL GLAZE 4.7K 5%	1/10W
R002	1-216-073-00	METAL GLAZE 10K 5%	1/10W	R066	1-216-025-00	METAL GLAZE 100 5%	1/10W
R003	1-216-033-00	METAL GLAZE 220 5%	1/10W	R067	1-216-025-00	METAL GLAZE 100 5%	1/10W
R004	1-216-033-00	METAL GLAZE 220 5%	1/10W	R074	1-216-295-00	METAL GLAZE 0 5%	1/10W
R005	1-216-033-00	METAL GLAZE 220 5%	1/10W	R075	1-216-295-00	METAL GLAZE 0 5%	1/10W
R006	1-216-049-00	METAL GLAZE 1K 5%	1/10W	R076	1-216-295-00	METAL GLAZE 0 5%	1/10W
				R078	1-216-073-00	METAL GLAZE 10K 5%	1/10W
				R079	1-216-295-00	METAL GLAZE 0 5%	1/10W
				R080	1-216-073-00	METAL GLAZE 10K 5%	1/10W
				R082	1-216-073-00	METAL GLAZE 10K 5%	1/10W
				R083	1-216-089-00	METAL GLAZE 47K 5%	1/10W
				R086	1-216-089-00	METAL GLAZE 47K 5%	1/10W
				R087	1-216-049-00	METAL GLAZE 1K 5%	1/10W
				R089	1-216-083-00	METAL GLAZE 27K 5%	1/10W
				R090	1-216-073-00	METAL GLAZE 10K 5%	1/10W

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KV-27TW77/27TW78
KV-32TW77/32TW78
RM-Y118

C

E

REF.NO.	PART NO.	DESCRIPTION	REMARK
D794	8-719-911-19	DIODE 1SS119	
D795	8-719-911-19	DIODE 1SS119	
<SOCKET>			
J701 Δ 1-540-071-13 SOCKET, PICTURE TUBE			
<COIL>			
L701	1-410-478-11	INDUCTOR 47UH	
<TRANSISTOR>			
Q711	8-729-926-73	TRANSISTOR 2SC3271F-N	
Q712	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q731	8-729-926-73	TRANSISTOR 2SC3271F-N	
Q732	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q751	8-729-926-73	TRANSISTOR 2SC3271F-N	
Q752	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q770	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q771	8-729-200-17	TRANSISTOR 2SA1091-0	
Q772	8-729-200-17	TRANSISTOR 2SA1091-0	
Q773	8-729-200-17	TRANSISTOR 2SA1091-0	
Q790	8-729-119-78	TRANSISTOR 2SC2785-HFE	
<RESISTOR>			
R700	1-247-739-11	CARBON 100 5% 1/2W	
R701	1-244-941-00	CARBON 680K 5% 1/2W	
R702	1-249-496-11	CARBON 100K 5% 1/2W	
R703	1-249-496-11	CARBON 100K 5% 1/2W	
R704	1-216-398-11	METAL OXIDE 5.6 5% 3W F	
R705	1-216-398-11	METAL OXIDE 5.6 5% 3W F	
R706	1-214-921-00	CARBON 220K 5% 1/2W	
R710	1-247-758-11	CARBON 3.3K 5% 1/2W	
R711	1-249-405-11	CARBON 100 5% 1/4W	
R712	1-215-924-00	METAL OXIDE 15K 5% 3W F	
R714	1-249-425-11	CARBON 4.7K 5% 1/4W	
R716	1-249-417-11	CARBON 1K 5% 1/4W	
R717	1-249-393-11	CARBON 10 5% 1/4W	
R718	1-249-413-11	CARBON 470 5% 1/4W	
R730	1-247-758-11	CARBON 3.3K 5% 1/2W	
R731	1-249-405-11	CARBON 100 5% 1/4W	
R732	1-215-924-00	METAL OXIDE 15K 5% 3W F	
R734	1-249-425-11	CARBON 4.7K 5% 1/4W	
R736	1-249-411-11	CARBON 330 5% 1/4W	
R737	1-249-393-11	CARBON 10 5% 1/4W	
R750	1-247-758-11	CARBON 3.3K 5% 1/2W	
R751	1-249-405-11	CARBON 100 5% 1/4W	
R752	1-215-924-00	METAL OXIDE 15K 5% 3W F	
R754	1-249-425-11	CARBON 4.7K 5% 1/4W	
R756	1-249-411-11	CARBON 330 5% 1/4W	
R757	1-249-393-11	CARBON 10 5% 1/4W	
R770	1-249-433-11	CARBON 22K 5% 1/4W	
R771	1-249-409-91	CARBON 220 5% 1/4W F	
R772	1-249-409-91	CARBON 220 5% 1/4W F	
R773	1-249-409-91	CARBON 220 5% 1/4W F	
R774	1-249-437-11	CARBON 47K 5% 1/4W	
R775	1-249-417-11	CARBON 1K 5% 1/4W F	
R776	1-249-409-91	CARBON 220 5% 1/4W F	
R790	1-249-413-11	CARBON 470 5% 1/4W	
R791	1-249-412-11	CARBON 390 5% 1/4W	
R792	1-249-424-11	CARBON 3.9K 5% 1/4W	

REF.NO.	PART NO.	DESCRIPTION	REMARK
R794	1-249-424-11	CARBON 3.9K 5% 1/4W	
R796	1-249-424-11	CARBON 3.9K 5% 1/4W	
R798	1-249-437-11	CARBON 47K 5% 1/4W	
R799	1-249-437-11	CARBON 47K 5% 1/4W	
<VARIABLE RESISTOR>			
RV701A 1-241-656-21 RES, ADJ, METAL FILM 110M			
RV702 1-230-641-11 RES, ADJ, METAL GLAZE 2.2M			

*A-1341-622-A E BOARD, COMPLETE (KV-32TW77/32TW78)			

*1-508-765-00 PIN, CONNECTOR (5MM PITCH) 3P			
<CAPACITOR>			
C1501	1-126-103-11	ELECT 470MF 20% 16V	
C1502	1-137-372-11	FILM 0.022MF 5% 50V	
C1503	1-102-234-00	CERAMIC 270PF 10% 500V	
C1504	1-136-165-00	FILM 0.1MF 5% 50V	
C1505	1-124-907-11	ELECT 10MF 20% 50V	
C1507	1-124-907-11	ELECT 10MF 20% 50V	
C1509	1-136-165-00	FILM 0.1MF 5% 50V	
C1510	1-137-370-11	FILM 0.01MF 5% 50V	
C1516	1-136-165-00	FILM 0.1MF 5% 50V	
C1519	1-136-104-00	FILM 0.16MF 5% 200V	
C1522	1-124-360-00	ELECT 1000MF 20% 16V	
C1523	1-136-177-00	FILM 1MF 5% 50V	
C1524	1-124-927-11	ELECT 4.7MF 20% 50V	
C1529	1-124-907-11	ELECT 10MF 20% 50V	
C1530	1-124-907-11	ELECT 10MF 20% 50V	
C1532	1-124-477-11	ELECT 47MF 20% 16V	
C1533	1-124-916-11	ELECT 22MF 20% 25V	
C1542	1-124-477-11	ELECT 47MF 20% 16V	
C1550	1-136-756-11	FILM 0.24MF 5% 200V	
<CONNECTOR>			
CN122	*1-573-299-11	CONNECTOR, BOARD TO BOARD 10P	
CN123	*1-573-299-11	CONNECTOR, BOARD TO BOARD 10P	
<DIODE>			
D1501	8-719-911-19	DIODE 1SS119	
D1502	8-719-801-35	THYRISTOR SHOR3D42	
D1503	8-719-980-78	DIODE ERA83-006	
D1504	8-719-936-84	DIODE RGP10GPKG3	
D1505	8-719-911-19	DIODE 1SS119	
D1506	8-719-911-19	DIODE 1SS119	
D1507	8-719-911-19	DIODE 1SS119	
D1508	8-719-110-17	DIODE RD10ESB2	
D1509	8-719-110-17	DIODE RD10ESB2	
D1510	8-719-911-19	DIODE 1SS119	
D1513	8-719-936-84	DIODE RGP10GPKG3	
D1515	8-719-911-19	DIODE 1SS119	
D1516	8-719-987-87	DIODE ERA85-009	
D1517	8-719-911-19	DIODE 1SS119	
<IC>			
IC1501	8-752-052-88	IC CXA1526P	
IC1502	8-759-982-10	IC RC7809FA	
IC1504	8-759-135-80	IC UPC358C	

E

D

The components identified by shading and mark Δ are critical for safety.
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REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
<COIL>				R1586	1-247-891-00	CARBON 330K 5% 1/4W	
L1502	1-459-592-11	COIL (WITH CORE) (PMC)		*****			
L1504	1-459-474-11	COIL (WITH CORE)		*A-1346-112-A	D BOARD, COMPLETE (KV-32TW77/32TW78)	*****	
<TRANSISTOR>				*A-1346-129-A	D BOARD, COMPLETE (KV-27TW77/27TW78)	*****	
Q1501	8-729-119-78	TRANSISTOR 2SC2785-HFE		1-533-223-11	CLIP, FUSE		
Q1502	8-729-140-96	TRANSISTOR 2SD774-34		4-382-854-11	SCREW (M3X10), P, SW (+)		
Q1503	8-729-119-76	TRANSISTOR 2SA1175-HFE		<CAPACITOR>			
Q1506	8-729-119-78	TRANSISTOR 2SC2785-HFE		C501	1-124-557-11	ELECT 1000MF 20% 25V	
Q1507	8-729-119-78	TRANSISTOR 2SC2785-HFE		C502	1-162-131-11	CERAMIC 220PF 10% 2KV	
Q1508	8-729-140-97	TRANSISTOR 2SB734-34		C503	1-124-557-11	ELECT 1000MF 20% 25V	
Q1509	8-729-140-97	TRANSISTOR 2SB734-34		C504	1-137-366-11	FILM 0.0022MF 5% 50V	
Q1511	8-729-119-76	TRANSISTOR 2SA1175-HFE		C505	1-124-916-11	ELECT 22MF 20% 25V	
Q1514	8-729-209-15	TRANSISTOR 2SD2012		C506	1-124-929-11	ELECT 22MF 20% 100V	
Q1519	8-729-119-78	TRANSISTOR 2SC2785-HFE		C507	1-124-046-00	ELECT 10MF 20% 160V	
Q1520	8-729-119-78	TRANSISTOR 2SC2785-HFE		C508	1-129-898-00	FILM 0.0022MF 5% 630V	
<RESISTOR>				(KV-27TW77/27TW78)			
R1501	1-249-409-11	CARBON 220 5% 1/4W		C509	1-124-916-11	ELECT 22MF 20% 25V	
R1502	1-249-409-11	CARBON 220 5% 1/4W		C511	1-123-024-21	ELECT 33MF 10% 160V	
R1503	1-249-435-11	CARBON 33K 5% 1/4W		C512	1-102-212-00	CERAMIC 820PF 10% 500V	
R1504	1-249-429-11	CARBON 10K 5% 1/4W		C513	1-102-212-00	CERAMIC 820PF 10% 500V	
R1505	1-249-421-11	CARBON 2.2K 5% 1/4W		C514	1-102-244-00	CERAMIC 220PF 10% 500V	
R1506	1-249-423-11	CARBON 3.3K 5% 1/4W		C515	1-137-416-11	FILM 0.01MF 10% 100V	
R1507	1-249-410-11	CARBON 270 5% 1/4W		C517	1-162-116-00	CERAMIC 680PF 10% 2KV	
R1508	1-249-437-11	CARBON 47K 5% 1/4W		C518	1-162-116-00	CERAMIC 680PF 10% 2KV	
R1509	1-249-429-11	CARBON 10K 5% 1/4W		C519 Δ	1-137-024-11	FILM 0.02MF 3% 2KV	
R1510	1-215-461-00	METAL 47K 1% 1/4W		C520 Δ	1-162-134-11	CERAMIC 470PF 10% 2KV	
R1511	1-216-379-11	METAL OXIDE 6.8 5% 2W	F	C521 Δ	1-136-316-51	FILM 0.056MF 5% 630V	
R1513	1-249-423-11	CARBON 3.3K 5% 1/4W		C522	1-106-383-00	MYLAR 0.047MF 99% 200V	
R1514	1-247-885-00	CARBON 180K 5% 1/4W		C523	1-102-002-00	CERAMIC 680PF 10% 500V	
R1515	1-215-905-11	METAL OXIDE 10 5% 3W	F	C524	1-102-212-00	CERAMIC 820PF 10% 500V	
R1519	1-249-417-11	CARBON 1K 5% 1/4W		C525	1-124-902-00	ELECT 0.47MF 20% 50V	
R1520	1-249-417-11	CARBON 1K 5% 1/4W		C526	1-106-395-00	MYLAR 0.15MF 10% 200V	
R1522	1-249-417-11	CARBON 1K 5% 1/4W		C527	1-124-341-00	ELECT 1MF 20% 200V	
R1527	1-249-417-11	CARBON 1K 5% 1/4W	F	C528	1-136-113-00	FILM 2MF 5% 200V	
R1528	1-249-438-11	CARBON 56K 5% 1/4W		C529	1-137-410-11	FILM 0.001MF 10% 100V	
R1529	1-249-434-11	CARBON 27K 5% 1/4W		C530	1-104-770-11	FILM 0.62MF 5% 200V	
R1530	1-249-432-11	CARBON 18K 5% 1/4W		C530	1-104-844-11	CAP, FILM (S) 0.62MF	
R1533	1-249-427-11	CARBON 6.8K 5% 1/4W		C531	1-124-477-11	ELECT 47MF 20% 25V	
R1534	1-249-424-11	CARBON 3.9K 5% 1/4W		C532	1-136-165-00	FILM 0.1MF 5% 50V	
R1535	1-249-425-11	CARBON 4.7K 5% 1/4W		C533	1-124-927-11	ELECT 4.7MF 20% 50V	
R1536	1-215-857-11	METAL OXIDE 10 5% 1W	F	C534	1-136-161-00	FILM 0.047MF 5% 50V	
R1537	1-249-404-00	CARBON 82 5% 1/4W		C535	1-124-911-11	ELECT 220MF 20% 50V	
R1538	1-216-379-11	METAL OXIDE 6.8 5% 2W	F	C536	1-137-421-91	FILM 0.068MF 10% 100V	
R1541	1-249-441-11	CARBON 100K 5% 1/4W		C538	1-136-161-00	FILM 0.047MF 5% 50V	
R1543	1-249-414-11	CARBON 560 5% 1/4W		C540	1-137-366-11	FILM 0.0022MF 5% 50V	
R1546	1-215-885-00	METAL OXIDE 68 5% 2W	F	C541	1-137-366-11	FILM 0.0022MF 5% 50V	
R1552	1-249-426-11	CARBON 5.6K 5% 1/4W		C542	1-130-481-00	FILM 0.0068MF 5% 50V	
R1554	1-249-393-11	CARBON 10 5% 1/4W		C545	1-124-927-11	ELECT 4.7MF 20% 50V	
R1556	1-249-438-11	CARBON 56K 5% 1/4W		C547	1-164-079-11	CERAMIC 330PF 10% 50V	
R1559	1-249-429-11	CARBON 10K 5% 1/4W		C548 Δ	1-162-116-91	CERAMIC 680PF 10% 2KV	
R1564	1-249-435-11	CARBON 33K 5% 1/4W		C550	1-106-387-00	MYLAR 0.068MF 10% 200V	
R1568	1-247-891-00	CARBON 330K 5% 1/4W		C553	1-164-079-11	CERAMIC 330PF 10% 50V	
R1569	1-249-413-11	CARBON 470 5% 1/4W		C561	1-162-815-11	CERAMIC 47PF 5% 500V	
R1578	1-249-423-11	CARBON 3.3K 5% 1/4W		C595	1-123-932-00	ELECT 4.7MF 20% 160V	
R1582	1-249-411-11	CARBON 330 5% 1/4W		C598	1-124-342-00	ELECT 3.3MF 20% 160V	
R1583	1-249-421-11	CARBON 2.2K 5% 1/4W		C600	1-124-907-11	ELECT 10MF 20% 50V	
R1585	1-249-441-11	CARBON 100K 5% 1/4W		C601 Δ	1-136-311-51	FILM 0.47MF 20% 125V	

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KV-27TW77/27TW78
KV-32TW77/32TW78
RM-Y118

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REF.NO.	PART NO.	DESCRIPTION	REMARK
C602	Δ 1-136-311-51	FILM 0.47MF 20% 125V	
C603	Δ 1-136-311-51	FILM 0.47MF 20% 125V	
C604	Δ 1-162-578-81	CERAMIC 0.0047MF 20% 400V	
C607	1-104-757-11	ELECT 470MF 20% 200V	
C608	1-104-757-11	ELECT 470MF 20% 200V	
C609	1-136-169-00	FILM 0.22MF 5% 50V	
C610	1-136-169-00	FILM 0.22MF 5% 50V	
C611	1-136-169-00	FILM 0.22MF 5% 50V	
C612	1-136-169-00	FILM 0.22MF 5% 50V	
C613	1-164-625-11	CERAMIC 680PF 10% 500V	
C614	1-164-625-11	CERAMIC 680PF 10% 500V	
C616	1-124-907-11	ELECT 10MF 20% 50V	
C617	1-124-618-11	ELECT 2200MF 20% 35V	
C618	1-124-557-11	ELECT 1000MF 20% 25V	
C619	1-124-360-00	ELECT 1000MF 20% 16V	
C620	1-164-644-11	CERAMIC 330PF 10% 500V	
C621	1-126-356-11	ELECT 220MF 20% 160V	
C623	1-162-117-00	CERAMIC 100PF 10% 500V	
C624	1-136-487-81	FILM 0.015MF 5% 50V	
C625	1-129-744-91	FILM 0.027MF 10% 400V	
C626	1-124-478-11	ELECT 100MF 20% 25V	
C627	1-124-443-00	ELECT 100MF 20% 10V	
C628	Δ 1-164-497-51	CERAMIC 470PF 20% 400V	
C634	1-165-127-11	CERAMIC 470PF 10% 500V	
C635	1-124-477-11	ELECT 47MF 20% 16V	
C636	1-137-374-11	FILM 0.047MF 5% 50V	
C637	1-124-916-11	ELECT 22MF 20% 25V	
C640	1-124-902-00	ELECT 0.47MF 20% 50V	
C641	1-124-443-00	ELECT 100MF 20% 10V	
C642	1-137-217-11	FILM 0.01MF 5% 1.25KV	
C643	1-137-218-11	FILM 0.012MF 5% 1.25KV	
C645	1-102-125-00	CERAMIC 0.0047MF 10% 50V	
C646	1-126-101-11	ELECT 100MF 20% 16V	
C647	1-124-916-11	ELECT 22MF 20% 25V	
C684	1-124-907-11	ELECT 10MF 20% 50V	
C695	1-124-907-11	ELECT 10MF 20% 50V	
C2205	1-124-925-11	ELECT 2.2MF 20% 50V	
C2208	1-124-925-11	ELECT 2.2MF 20% 50V	
C2210	1-124-120-11	ELECT 220MF 20% 25V	
C2211	1-124-477-11	ELECT 47MF 20% 25V	
C2212	1-124-120-11	ELECT 220MF 20% 25V	
C2213	1-136-173-00	FILM 0.47MF 5% 50V	
C2215	1-136-169-00	FILM 0.22MF 5% 50V	
C2216	1-124-480-11	ELECT 470MF 20% 25V	
C2217	1-136-169-00	FILM 0.22MF 5% 50V	
C2218	1-124-557-11	ELECT 1000MF 20% 25V	
C2219	1-124-557-11	ELECT 1000MF 20% 25V	
C2220	1-124-925-11	ELECT 2.2MF 20% 50V	

<CONNECTOR>

CN104	*1-573-979-11	CONNECTOR, BOARD TO BOARD 11P
CN105	*1-508-768-00	PIN, CONNECTOR (5MM PITCH) 6P
CN107	*1-580-798-11	CONNECTOR PIN (DY) 6P
CN108	1-573-296-11	CONNECTOR, BOARD TO BOARD 10P (KV-32TW77/32TW78)
CN109	1-573-296-11	CONNECTOR, BOARD TO BOARD 10P (KV-32TW77/32TW78)
CN113	*1-508-765-00	PIN, CONNECTOR (5MM PITCH) 3P
CN114	*1-580-843-11	PIN, CONNECTOR (POWER)
CN115	1-573-298-11	CONNECTOR, BOARD TO BOARD 20P
CN116	*1-691-616-11	CONNECTOR, BOARD TO BOARD 15P
CN117	*1-573-978-11	CONNECTOR, BOARD TO BOARD 11P

REF.NO.	PART NO.	DESCRIPTION	REMARK
<DIODE>			
D501	8-719-028-72	DIODE RGP02-17EL-6433	
D502	8-719-979-85	DIODE EGP20G	
D503	8-719-979-85	DIODE EGP20G	
D504	Δ 8-719-302-44	DIODE EL17-V1	
D505	8-719-936-84	DIODE RGP10GPKG3	
D506	8-719-945-80	DIODE ERC06-15S	
D507	8-719-945-80	DIODE ERC06-15S	
D508	8-719-900-26	DIODE ERD29-08J	
D509	8-719-936-84	DIODE RGP10GPKG3	
D510	8-719-936-82	DIODE GP080PKG3	
D511	8-719-936-82	DIODE GP080PKG3	
D512	8-719-109-84	DIODE RD5.1ESB1	
D513	8-719-936-82	DIODE GP080PKG3	
D514	8-719-911-19	DIODE 1SS119	
D515	8-719-911-19	DIODE 1SS119	
D601	8-719-911-19	DIODE 1SS119	
D602	Δ 8-719-510-63	DIODE DAS8601-E	
D603	8-719-500-69	DIODE S3V1OSS	
D605	8-719-500-69	DIODE S3V1OSS	
D607	8-719-510-02	DIODE D1NS4	
D608	8-719-510-02	DIODE D1NS4	
D609	8-719-510-02	DIODE D1NS4	
D610	8-719-510-02	DIODE D1NS4	
D611	8-719-510-02	DIODE D1NS4	
D612	8-719-031-80	DIODE D5SC4MR	
D613	8-719-022-97	DIODE D2S4MF	
D614	8-719-110-33	DIODE RD12ESB3	
D615	8-719-027-43	DIODE S2L20UF	
D616	8-719-027-43	DIODE S2L20UF	
D617	8-719-027-43	DIODE S2L20UF	
D618	8-719-027-43	DIODE S2L20UF	
D619	8-719-510-02	DIODE D1NS4	
D622	8-719-911-19	DIODE 1SS119	
D623	8-719-911-19	DIODE 1SS119	
D624	8-719-911-19	DIODE 1SS119	
D626	8-719-510-48	DIODE D1N20R	
D627	8-719-510-48	DIODE D1N20R	
D628	8-719-911-19	DIODE 1SS119	
D633	8-719-110-09	DIODE RD8.2ESB3	
D634	8-719-911-19	DIODE 1SS119	
D635	8-719-911-19	DIODE 1SS119	
D636	8-719-510-48	DIODE D1N20R	
D637	8-719-911-19	DIODE 1SS119	
D638	8-719-911-19	DIODE 1SS119	

<FUSE>

F601	Δ 1-532-748-11	FUSE, GLASS TUBE (6.3A/125V)
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<FERRITE BEAD>

FB501	1-412-911-11	INDUCTOR, FERRITE BEAD
FB502	1-412-911-11	INDUCTOR, FERRITE BEAD
FB601	1-412-911-11	INDUCTOR, FERRITE BEAD
FB602	1-412-911-11	INDUCTOR, FERRITE BEAD
FB603	1-412-911-11	INDUCTOR, FERRITE BEAD
FB604	1-412-911-11	INDUCTOR, FERRITE BEAD

D

• The components identified by Δ in this manual have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation. Should replacement be required, replace only with the value originally used.

The components identified by shading and mark Δ are critical for safety.
Replace only with part number specified.

REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
FB605	1-412-911-11	INDUCTOR, FERRITE BEAD		R504	1-215-872-11	METAL OXIDE 3.3K 5%	1W F
FB606	1-412-911-11	INDUCTOR, FERRITE BEAD		R505	1-249-377-11	CARBON 0.47 5%	1/4W F
FB613	1-412-911-11	INDUCTOR, FERRITE BEAD		R506	1-215-886-11	METAL OXIDE 100 5%	2W F
FB614	1-412-911-11	INDUCTOR, FERRITE BEAD		R507	1-249-429-11	CARBON 10K 5%	1/4W
<IC>				R508	1-249-425-11	CARBON 4.7K 5%	1/4W
IC501	8-759-980-58	IC TDA8172		R509	1-249-389-11	CARBON 4.7 5%	1/4W F
IC504	8-759-103-93	IC UPC393C		Δ R511	Δ	CARBON	1/4W
<POWER MODULE>				R512	1-249-389-11	CARBON 4.7 5%	1/4W F
Δ IC601A	Δ 1-810-051-11	POWER MODULE DM-48		R513	1-216-393-00	METAL OXIDE 2.2 5%	3W F
<IC>				R514	1-249-429-11	CARBON 10K 5%	1/4W
IC602	8-759-805-37	IC L78L05D-MA		R515	1-216-363-00	METAL OXIDE 0.33 5%	2W F
IC604	8-759-924-12	IC LM7805CT		R516	1-249-401-11	CARBON 47 5%	1/4W
IC605	8-759-929-62	IC LM7812CT		R517	1-215-916-00	METAL OXIDE 680 5%	3W F
IC606	8-759-982-10	IC RC7809FA		R518	1-215-916-00	METAL OXIDE 680 5%	3W F
IC610	8-759-982-21	IC RC78L05A		R519	1-249-426-11	CARBON 5.6K 5%	1/4W F
IC2200	8-759-980-43	IC TDA2009A		R520	1-249-423-11	CARBON 3.3K 5%	1/4W
<COIL>				R521	1-249-411-11	CARBON 330 5%	1/4W
L502	1-421-465-00	COIL, FERRITE CHOKE 68UH		R522	1-215-886-11	METAL OXIDE 100 5%	2W F
L503	1-412-524-11	INDUCTOR 8.2UH		R523	1-215-862-11	METAL OXIDE 68 5%	1W F
L504	1-410-669-31	INDUCTOR 33UH		Δ R524	Δ	CARBON	1/4W
L505	1-459-104-00	COIL, WITH CORE		R525	1-215-884-11	METAL OXIDE 47 5%	2W F
L506	1-422-613-11	COIL, AIR CORE					(KV-27TW77/27TW78)
L508	1-412-553-11	INDUCTOR 3.3MMH		R526	1-247-887-00	CARBON 220K 5%	1/4W
Δ L509	Δ 1-460-173-21	COIL, HORIZONTAL LINEARITY		R527	1-215-861-00	METAL OXIDE 47 5%	1W F
L510	1-406-607-11	COIL, CHOKE 15MMH		R528	1-260-326-71	CARBON 680 5%	1/2W
L513	1-412-524-11	INDUCTOR 8.2UH		R530	1-215-445-00	METAL 10K 1%	1/4W
<COIL>				R531	1-247-903-91	CARBON 1M 5%	1/4W
PM501	1-810-061-21	PROTECTOR MODULE PM-39		R532	1-215-446-00	METAL 11K 1%	1/4W
<IC LINK>				R534	1-249-385-11	CARBON 2.2 5%	1/4W F
Δ PS2201A	Δ 1-532-675-91	LINK, IC (1.5A)		R535	1-216-453-00	METAL OXIDE 270 5%	2W F
<TRANSISTOR>				R536	1-249-389-11	CARBON 4.7 5%	1/4W F
Q502	8-729-119-80	TRANSISTOR 2SC2688-LK		R539	1-215-459-00	METAL 39K 1%	1/4W
Q503	8-729-809-29	TRANSISTOR 2SC4159-B		R543	1-249-419-11	CARBON 1.5K 5%	1/4W
Q505	8-729-119-78	TRANSISTOR 2SC2785-HFE		R546	1-249-431-11	CARBON 15K 5%	1/4W
Q591	8-729-016-32	TRANSISTOR 2SC4927-01		R547	1-247-883-00	CARBON 150K 5%	1/4W
Q601	8-729-019-51	TRANSISTOR 2SC4834MNP		R550	1-249-429-11	CARBON 10K 5%	1/4W
Q602	8-729-019-51	TRANSISTOR 2SC4834MNP		R551	1-249-429-11	CARBON 10K 5%	1/4W
Q603	8-729-119-76	TRANSISTOR 2SA1175-HFE		R554	1-216-371-00	METAL OXIDE 1.5 5%	2W F
Q604	8-729-119-78	TRANSISTOR 2SC2785-HFE		R556	1-249-411-11	CARBON 330 5%	1/4W
Q605	8-729-119-78	TRANSISTOR 2SC2785-HFE		R557	1-249-415-11	CARBON 680 5%	1/4W F
Q611	8-729-119-78	TRANSISTOR 2SC2785-HFE		R561	1-249-429-11	CARBON 10K 5%	1/4W
Q613	8-729-924-90	TRANSISTOR 2SB1370-EF		R562	1-215-437-00	METAL 4.7K 1%	1/4W
Q614	8-729-119-78	TRANSISTOR 2SC2785-HFE		R563	1-249-429-11	CARBON 10K 5%	1/4W
Q2202	8-729-119-78	TRANSISTOR 2SC2785-HFE		R564	1-249-433-11	CARBON 22K 5%	1/4W
Q2203	8-729-119-76	TRANSISTOR 2SA1175-HFE		R566	1-249-435-11	CARBON 33K 5%	1/4W
<RESISTOR>				R580	1-249-411-11	CARBON 330 5%	1/4W
R501	1-249-378-11	CARBON 0.56 5%	1/4W F	Δ R601	Δ 1-202-888-91	SOLID 2.2M 20%	1/2W
R503	1-215-862-11	METAL OXIDE 68 5%	1W F	Δ R602	Δ 1-202-888-91	SOLID 2.2M 20%	1/2W
				R603	1-249-419-11	CARBON 1.5K 5%	1/4W
				R605	1-247-893-11	CARBON 390K 5%	1/4W
				R606	1-247-893-11	CARBON 390K 5%	1/4W
				Δ R607	Δ 1-202-933-61	FUSIBLE 0.1 10%	1/2W F
				R608	1-215-860-11	METAL OXIDE 33 5%	1W F
				R609	1-216-352-11	METAL OXIDE 1.8 5%	1W F
				R610	1-216-352-11	METAL OXIDE 1.8 5%	1W F
				R611	1-216-468-91	METAL OXIDE 82K 5%	2W F
				R612	1-216-468-91	METAL OXIDE 82K 5%	2W F
				R613	1-215-860-11	METAL OXIDE 33 5%	1W F
				R614	1-215-860-11	METAL OXIDE 33 5%	1W F
				R615	1-249-421-11	CARBON 2.2K 5%	1/4W
				R616	1-249-417-11	CARBON 1K 5%	1/4W
				R617	1-249-377-11	CARBON 0.47 5%	1/4W F
				R618	1-249-377-11	CARBON 0.47 5%	1/4W F

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REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
R619	1-249-377-11	CARBON	0.47 5% 1/4W F	<SWITCH>			
R621	1-249-377-11	CARBON	0.47 5% 1/4W F	S501	1-572-707-11	SWITCH, LEVER	
R622	1-249-377-11	CARBON	0.47 5% 1/4W F	S502	1-572-707-11	SWITCH, LEVER	
R623	1-249-377-11	CARBON	0.47 5% 1/4W F	<TRANSISTOR>			
R624	1-249-377-11	CARBON	0.47 5% 1/4W F	T501 Δ 1-453-146-11	TRANSFORMER ASSY, FLYBACK (NX2604A3)		
R625	1-249-377-11	CARBON	0.47 5% 1/4W F	T502 Δ 1-437-195-14	TRANSFORMER, HORIZONTAL DRIVE		
R627	1-249-377-11	CARBON	0.47 5% 1/4W F	T503 Δ 1-424-545-22	TRANSFORMER, FERRITE (PMT)		
R628	1-249-377-11	CARBON	0.47 5% 1/4W F	T601 Δ 1-423-593-11	TRANSFORMER, LINE FILTER (LFT)		
R629	1-249-388-11	CARBON	3.9 5% 1/4W F	T602 Δ 1-424-220-21	TRANSFORMER, LINE FILTER		
R630	1-215-857-11	METAL OXIDE	10 5% 1W F	T603 Δ 1-423-563-11	TRANSFORMER, CONVERTER DRIVE		
R632	1-249-417-11	CARBON	1K 5% 1/4W F	T604 Δ 1-423-615-11	TRANSFORMER, CONVERTER (PIT)		
R633	1-249-405-11	CARBON	100 5% 1/4W F	T605	1-423-582-11	TRANSFORMER, FERRITE (SBT)	
R635	1-249-413-11	CARBON	470 5% 1/4W F	<THERMISTOR>			
R636	1-249-383-11	CARBON	1.5 5% 1/4W F	THP601 Δ 1-809-539-11	THERMISTOR, POSITIVE		
R637	1-249-421-11	CARBON	2.2K 5% 1/4W	<VARISTOR>			
R638	1-249-423-11	CARBON	3.3K 5% 1/4W	VDR601	1-807-288-11	VARISTOR	
R639	1-249-423-11	CARBON	3.3K 5% 1/4W	VDR602	1-810-053-21	VARISTOR	
R640 Δ	1-202-893-91	SOLID	8.2M 20% 1/2W	VDR603	1-810-053-21	VARISTOR	
R643	1-216-379-11	METAL OXIDE	6.8 5% 2W F	*****			
R644 Δ	1-212-853-61	FUSIBLE	6.8 5% 1/4W F	*1-646-717-11	H BOARD		
R645	1-249-377-11	CARBON	0.47 5% 1/4W F	*****			
R646	1-249-429-11	CARBON	10K 5% 1/4W	<CAPACITOR>			
R647	1-249-433-11	CARBON	22K 5% 1/4W	C1001	1-124-916-11	ELECT 22MF 20% 25V	
R648	1-249-414-11	CARBON	560 5% 1/4W	C1002	1-124-903-11	ELECT 1MF 20% 50V	
R649	1-216-431-11	METAL OXIDE	560 5% 1W F	C1003	1-124-903-11	ELECT 1MF 20% 50V	
R650	1-249-405-11	CARBON	100 5% 1/4W F	C1004	1-124-122-11	ELECT 100MF 20% 50V	
R651 Δ	1-212-954-61	FUSIBLE	6.8 5% 1/2W F	<CONNECTOR>			
R652 Δ	1-212-954-61	FUSIBLE	6.8 5% 1/2W F	CN154	*1-564-520-11	PLUG, CONNECTOR 5P	
R653	1-249-381-11	CARBON	1 5% 1/4W	CN155	*1-564-523-31	PLUG, CONNECTOR 8P	
R654	1-216-385-11	METAL OXIDE	0.47 5% 3W F	<DIODE>			
R655	1-249-417-11	CARBON	1K 5% 1/4W F	D1004	1-810-039-11	LED UNIT	
R656	1-249-381-11	CARBON	1 5% 1/4W	<IC>			
R657	1-249-417-11	CARBON	1K 5% 1/4W	IC1001	8-746-185-11	IC SBX1618-59	
R658	1-249-389-11	CARBON	4.7 5% 1/4W F	<JACK>			
R659	1-247-883-00	CARBON	150K 5% 1/4W	J1001	1-695-585-11	JACK BLOCK, PIN (L TYPE) 3P	
R660	1-249-433-11	CARBON	22K 5% 1/4W	<RESISTOR>			
R661	1-249-406-11	CARBON	120 5% 1/4W	R1001	1-247-804-11	CARBON 75 5% 1/4W	
R690	1-249-423-11	CARBON	3.3K 5% 1/4W	R1002	1-249-425-11	CARBON 4.7K 5% 1/4W	
R691	1-249-423-11	CARBON	3.3K 5% 1/4W	R1003	1-216-113-00	METAL GLAZE 470K 5% 1/10W	
R2209	1-249-427-11	CARBON	6.8K 5% 1/4W	R1004	1-249-425-11	CARBON 4.7K 5% 1/4W	
R2210	1-249-435-11	CARBON	33K 5% 1/4W	R1005	1-216-113-00	METAL GLAZE 470K 5% 1/10W	
R2211	1-249-427-11	CARBON	6.8K 5% 1/4W	R1007	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R2212	1-249-435-11	CARBON	33K 5% 1/4W	R1008	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R2215	1-249-425-11	CARBON	4.7K 5% 1/4W	<RELAY>			
R2216	1-249-437-11	CARBON	47K 5% 1/4W	RY601A	1-515-684-22	RELAY	
R2217	1-249-435-11	CARBON	33K 5% 1/4W	RY602	1-515-516-00	RELAY	
R2218	1-249-441-11	CARBON	100K 5% 1/4W				
R2219	1-249-413-11	CARBON	470 5% 1/4W				
R2220	1-249-430-11	CARBON	12K 5% 1/4W				
R2221	1-249-430-11	CARBON	12K 5% 1/4W				
R2222	1-249-398-11	CARBON	27 5% 1/4W				
R2223	1-249-418-11	CARBON	1.2K 5% 1/4W				
R2224	1-249-418-11	CARBON	1.2K 5% 1/4W				
R2225	1-249-398-11	CARBON	27 5% 1/4W				
R2226	1-249-385-11	CARBON	2.2 5% 1/4W F				
R2227	1-249-385-11	CARBON	2.2 5% 1/4W F				
R2228	1-249-421-11	CARBON	2.2K 5% 1/4W				
R2229	1-249-421-11	CARBON	2.2K 5% 1/4W				

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The components identified by
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REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
R1009	1-216-065-00	METAL GLAZE 4.7K 5%	1/10W	D402	8-719-110-17	DIODE RD10ESB2	
R1010	1-216-055-00	METAL GLAZE 1.8K 5%	1/10W	D403	8-719-110-17	DIODE RD10ESB2	
R1011	1-216-025-00	METAL GLAZE 100 5%	1/10W	D404	8-719-110-17	DIODE RD10ESB2	
R1012	1-216-049-00	METAL GLAZE 1K 5%	1/10W	D405	8-719-110-17	DIODE RD10ESB2	
R1013	1-216-033-00	METAL GLAZE 220 5%	1/10W				
R1014	1-216-047-00	METAL GLAZE 820 5%	1/10W	D408	8-719-110-17	DIODE RD10ESB2	
R1015	1-216-033-00	METAL GLAZE 220 5%	1/10W	D410	8-719-110-17	DIODE RD10ESB2	
<SWITCH>				D411	8-719-110-17	DIODE RD10ESB2	
S1001	1-692-431-21	SWITCH, TACTILE		D429	8-719-110-17	DIODE RD10ESB2	
S1002	1-692-431-21	SWITCH, TACTILE		D430	8-719-110-17	DIODE RD10ESB2	
S1003	1-692-431-21	SWITCH, TACTILE					
S1004	1-692-431-21	SWITCH, TACTILE		D431	8-719-110-17	DIODE RD10ESB2	
S1005	1-692-431-21	SWITCH, TACTILE		D436	8-719-110-17	DIODE RD10ESB2	
S1006	1-692-431-21	SWITCH, TACTILE		D437	8-719-110-17	DIODE RD10ESB2	
S1007A	1-692-431-21	SWITCH, TACTILE		<IC>			
*****				IC402	8-752-062-86	IC CXA1545AS	
*A-1934-415-A UA BOARD, COMPLETE				<JACK>			
*****				J401	1-750-515-11	TERMINAL BLOCK, S 3P	
<CAPACITOR>				J402	1-750-517-11	JACK BLOCK, PIN 3P	
C401	1-163-031-11	CERAMIC CHIP 0.01MF	50V	J404	1-750-516-11	JACK BLOCK, PIN 2P	
C402	1-124-916-11	ELECT 22MF 20%	25V	<JUMPER RESISTOR>			
C405	1-124-916-11	ELECT 22MF 20%	25V	JR402	1-216-295-00	METAL GLAZE 0 5%	1/10W
C406	1-124-903-11	ELECT 1MF 20%	50V	JR403	1-216-295-00	METAL GLAZE 0 5%	1/10W
C407	1-124-903-11	ELECT 1MF 20%	50V	JR408	1-216-295-00	METAL GLAZE 0 5%	1/10W
C408	1-124-916-11	ELECT 22MF 20%	25V	JR410	1-216-295-00	METAL GLAZE 0 5%	1/10W
C409	1-124-903-11	ELECT 1MF 20%	50V	JR411	1-216-295-00	METAL GLAZE 0 5%	1/10W
C410	1-124-903-11	ELECT 1MF 20%	50V	JR412	1-216-295-00	METAL GLAZE 0 5%	1/10W
C412	1-124-916-11	ELECT 22MF 20%	25V	JR415	1-216-295-00	METAL GLAZE 0 5%	1/10W
C413	1-124-907-11	ELECT 10MF 20%	50V	JR416	1-216-295-00	METAL GLAZE 0 5%	1/10W
C414	1-124-499-11	ELECT 1MF 20%	50V	JR418	1-216-295-00	METAL GLAZE 0 5%	1/10W
C415	1-124-499-11	ELECT 1MF 20%	50V	JR419	1-216-295-00	METAL GLAZE 0 5%	1/10W
C416	1-124-907-11	ELECT 10MF 20%	50V	JR429	1-216-295-00	METAL GLAZE 0 5%	1/10W
C417	1-124-902-00	ELECT 0.47MF 20%	50V	JR430	1-216-295-00	METAL GLAZE 0 5%	1/10W
C418	1-124-902-00	ELECT 0.47MF 20%	50V	JR431	1-216-295-00	METAL GLAZE 0 5%	1/10W
C419	1-124-477-11	ELECT 47MF 20%	16V	JR434	1-216-295-00	METAL GLAZE 0 5%	1/10W
C420	1-163-031-11	CERAMIC CHIP 0.01MF	50V	JR435	1-216-295-00	METAL GLAZE 0 5%	1/10W
C421	1-124-916-11	ELECT 22MF 20%	25V	JR498	1-216-295-00	METAL GLAZE 0 5%	1/10W
C433	1-124-482-11	ELECT 33MF 20%	25V	JR499	1-216-295-00	METAL GLAZE 0 5%	1/10W
C434	1-163-117-00	CERAMIC CHIP 100PF 5%	50V	JR1408	1-216-295-00	METAL GLAZE 0 5%	1/10W
C440	1-124-907-11	ELECT 10MF 20%	50V	<COIL>			
C441	1-124-477-11	ELECT 47MF 20%	16V	L401	1-410-473-11	INDUCTOR 18UH	
C442	1-163-117-00	CERAMIC CHIP 100PF 5%	50V	L403	1-410-476-11	INDUCTOR 33UH	
C462	1-126-101-11	ELECT 100MF 20%	16V	L404	1-410-669-31	INDUCTOR 33UH	
<FILTER>				<TRANSISTOR>			
CM402	1-466-912-21	FILTER BLOCK, COMB		Q401	8-729-422-27	TRANSISTOR 2SD601A-Q	
<CONNECTOR>				Q405	8-729-422-36	TRANSISTOR 2SB709A-Q	
CN141	*1-564-520-11	PLUG, CONNECTOR 5P		Q406	8-729-422-36	TRANSISTOR 2SB709A-Q	
CN143	1-750-395-11	SOCKET, CONNECTOR 32P		Q414	8-729-422-27	TRANSISTOR 2SD601A-Q	
CN146	1-573-300-11	CONNECTOR, BOARD TO BOARD 18P		<RESISTOR>			
CN147	1-750-395-11	SOCKET, CONNECTOR 32P		R401	1-247-804-11	CARBON 75 5%	1/4W
CN148	*1-564-517-11	PLUG, CONNECTOR 2P		R402	1-216-113-00	METAL GLAZE 470K 5%	1/10W
<DIODE>				R403	1-216-113-00	METAL GLAZE 470K 5%	1/10W
D401	8-719-110-17	DIODE RD10ESB2		R404	1-247-804-11	CARBON 75 5%	1/4W
				R405	1-216-113-00	METAL GLAZE 470K 5%	1/10W

The components identified by shading and mark Δ are critical for safety.
Replace only with part number specified.

KV-32TW77/32TW78
RM-Y118

UA

REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
R406	1-216-113-00	METAL GLAZE	470K 5% 1/10W				
R407	1-247-804-11	CARBON	75 5% 1/4W				
R408	1-216-113-00	METAL GLAZE	470K 5% 1/10W				
R409	1-216-113-00	METAL GLAZE	470K 5% 1/10W				
R410	1-249-425-11	CARBON	4.7K 5% 1/4W				
R411	1-249-425-11	CARBON	4.7K 5% 1/4W				
R412	1-249-425-11	CARBON	4.7K 5% 1/4W				
R413	1-249-425-11	CARBON	4.7K 5% 1/4W				
R414	1-247-804-11	CARBON	75 5% 1/4W				
R415	1-216-065-00	METAL GLAZE	4.7K 5% 1/10W				
R416	1-216-647-11	METAL CHIP	680 0.50% 1/10W				
R417	1-216-645-11	METAL CHIP	560 0.50% 1/10W				
R421	1-216-065-00	METAL GLAZE	4.7K 5% 1/10W				
R425	1-216-065-00	METAL GLAZE	4.7K 5% 1/10W				
R431	1-216-049-00	METAL GLAZE	1K 5% 1/10W				
R432	1-216-295-00	METAL GLAZE	0 5% 1/10W				
R434	1-216-049-00	METAL GLAZE	1K 5% 1/10W				
R435	1-216-295-00	METAL GLAZE	0 5% 1/10W				
R439	1-216-049-00	METAL GLAZE	1K 5% 1/10W				
R441	1-216-049-00	METAL GLAZE	1K 5% 1/10W				
R444	1-216-095-00	METAL GLAZE	82K 5% 1/10W				
R445	1-216-073-00	METAL GLAZE	10K 5% 1/10W				
R446	1-216-073-00	METAL GLAZE	10K 5% 1/10W				
R450	1-216-643-11	METAL CHIP	470 0.50% 1/10W				
R451	1-216-065-00	METAL GLAZE	4.7K 5% 1/10W				
R453	1-216-645-11	METAL CHIP	560 0.50% 1/10W				
R454	1-216-295-00	METAL GLAZE	0 5% 1/10W				
R456	1-216-041-00	METAL GLAZE	470 5% 1/10W				
R457	1-216-033-00	METAL GLAZE	220 5% 1/10W				
R458	1-216-033-00	METAL GLAZE	220 5% 1/10W				
R475	1-216-049-00	METAL GLAZE	1K 5% 1/10W				
R478	1-216-041-00	METAL GLAZE	470 5% 1/10W				
R482	1-249-417-11	CARBON	1K 5% 1/4W				
R483	1-249-417-11	CARBON	1K 5% 1/4W				
R490	1-216-295-00	METAL GLAZE	0 5% 1/10W				
R491	1-216-295-00	METAL GLAZE	0 5% 1/10W				
R492	1-216-295-00	METAL GLAZE	0 5% 1/10W				
R1438	1-216-081-00	METAL GLAZE	22K 5% 1/10W				

MISCELLANEOUS							

Δ.1-402-952-11 COIL, DEMAGNETIZATION (KV-32TW77/32TW78)							
Δ.1-406-726-11 COIL, DEMAGNETIZATION (KV-27TW77/27TW78)							
Δ.1-451-315-41 DEFLECTION YOKE (Y34FXA) (KV-32TW77/32TW78)							
Δ.1-451-275-41 DEFLECTION YOKE (Y28PFA) (KV-27TW77/27TW78)							
1-452-032-00 MAGNET,DISK; 10MM ϕ							
1-452-094-00 MAGNET,ROTATABLE DISK; 15MM ϕ							
1-544-549-11 SPEAKER							
1-573-657-11 PLUG, F-PIN							
Δ.1-751-059-11 CORD, POWER (WITH CONNECTOR)							
Δ.8-733-723-05 PICTURE TUBE (A80JYV50X) (KV-32TW77/32TW78)							
Δ.8-733-838-05 PICTURE TUBE (A68KZJ50X) (KV-27TW77/27TW78)							

ACCESSORIES & PACKING MATERIALS							

1-467-059-11 REMOTE COMMANDER (RM-Y118)							
9-903-826-01 COVER, BATTERY							
*3-704-319-01 BAG (STANDARD), PROTECTION (KV-32TW77/32TW78)							
3-756-618-21 MANUAL, INSTRUCTION							
3-756-618-41 MANUAL, INSTRUCTION							
*4-030-895-01 JOINT (KV-32TW77/32TW78)							
*4-040-409-01 CUSHION (UPPER) (ASSY) (KV-27TW77/27TW78)							
*4-040-410-01 CUSHION (LOWER) (ASSY) (KV-27TW77/27TW78)							
*4-040-411-01 INDIVIDUAL CARTON (KV-27TW77/27TW78)							
*4-040-412-01 CUSHION (UPPER) (ASSY) (KV-32TW77/32TW78)							
*4-040-413-01 CUSHION (LOWER) (ASSY) (KV-32TW77/32TW78)							
*4-040-414-01 SHEET, CORRUGATED FIBERBOARD (KV-32TW77/32TW78)							
*4-040-416-01 TRAY (KV-32TW77/32TW78)							
*4-040-420-01 INDIVIDUAL CARTON (KV-32TW77/32TW78)							
*4-386-906-01 SHEET, PROTECTION (KV-32TW77/32TW78)							
*4-395-035-01 BAG, POLYETHYLENE (KV-27TW77/27TW78)							

